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ABSTRACT

This report examines the exploration and implementation of a multi-faceted approach to the use of computers in the instructional setting in the Worthington (Ohio) School District. Section I presents major steps which occurred during the 1981-82 and 1982-83 school years. These include formation of task forces, descriptions of major ways in which computers could benefit students/teachers (computer awareness, programming, courseware, and classroom management), pilot projects, information on community education, software selection, and a policy statement. Section II includes the findings/conclusions of the pilot projects (alternative campus, business, high school computer science, English as a second language, and Logo pilots) and a detailed account of the Minnesota Educational Computing Consortium (MECC) inservice program; background information, inservice design, findings, conclusions, and recommendations related to the MECC program are included in the latter. Recommendations resulting from the pilot projects as well as proposed projects are presented in section III). Five issues facing the school district are addressed in section IV These issues focus on computer languages in the K-6 curriculum, teacher readiness, a "survey" course, software selection, and hardware selection. Supporting documentation, including MECC pre-/post-evaluation results and an MECC evaluation form is included in appendices. (JN)

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PROGRESS AND PLANNING REPORT:
K-12 Use of Computers in the Instructional Setting

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Worthington Schools

May 16, 1983

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FORWARD

This report represents primarily the views of the Computer Planning Team in developing an overall plan for computer usage in the instructional setting. The plans that are outlined herein for the 1983-84 school year continue the exploration begun this year. Many questions remain unanswered or require further investigation; therefore, this report should be viewed as a planning document.

By continuing pilots, exploring new areas, and developing ways to handle software selection and computer awareness activities, the Computer Planning Team will obtain a greater understanding of the consequences and issues which need to be considered for systematic integration of each part. Certainly, teacher readiness coupled with curriculum implications and necessary resources are on-going issues that must be addressed as more is learned about each facet.

Many individuals were involved in the planning, exploration and investigation this year and they deserve recognition for their efforts. The Task Force members, listed below, met on a number of occasions to review and make suggestions to the Computer Planning Team. These members provided new insights which helped the Computer Planning Team in making thoughtful decisions.

Harry Allen	Judy Hummel	Tom Ralley
Sterling Apthorp	Steve Huzicko	Gary Rusk
George Banning	Donna Kelley	Keith Schlarb
Tom Beck	Jim Leitzel	Dick Shumway
Bill Esch	Mike Locke	Penny Ury
Richard Fertel	Tim O'Keefe	Fran Webb
Noel Guitry	Abramo Ottolenghi	

In addition to the Task Force, many district teachers and administrators participated in activities throughout the year. The MECC inservice involved about 75 teachers and administrators. For the most part, those who participated demonstrated their interest and willingness to work with colleagues at their respective buildings in using these materials. Other staff were involved with the six pilots. Seven elementary staff volunteered to experiment with Logo. Those teachers included:

Sue Allen	Mary Dawson
Karen Carpenter	Carol Price
Kathy Carter	Ned Williams
Jean Cook	

These teachers were very conscientious and spent a great deal of time learning the language and using it with their students. They also met frequently to evaluate their progress and consider both problems and issues involved with teaching and using a computer language with children of this age. Their enthusiasm and eagerness were a large factor in the success of this pilot during this first year.

Other teachers and administrators were responsible for conducting the other pilots. Four teachers (Maureen Amorose, Clara Bunk, Betty Kincaid & Jerri Lawrence) participated in the English as a Second Language pilot. Two of these individuals formulated the pilot design to ascertain whether software materials could help student acquire English language skills.

Special Education teachers also recognized the potential of using the computer to motivate student learning. Jane Weislogel and Gretchen Altomonte designed the pilot but other elementary and middle school teachers participated.

The business department teachers spent a great deal of time reviewing software appropriate to many of their courses. Roger Graber, department chairperson organized and headed up the pilot. The entire department participated in searching for quality software to enhance their course including accounting, personal law and economics.

The high school mathematics staff, particularly those responsible for teaching the computer science courses spent considerable time becoming knowledgeable in the use of the new hardware configuration. In addition, Jerry Haas, who taught the two advanced classes, learned and incorporated Pascal (computer language) for the second semester. Mr. Haas is to be commended for his work in this area and his willingness to take on these tasks during the school year. Likewise, Jennifer Young, as mathematics chairperson, was instrumental in the investigation phase of the pilot.

The efforts and contributions of all of these individuals are to be applauded. Working behind the scenes but devoting hundreds of hours to the development of pilots and other activities are the teachers who form the Computer Planning Team. These individuals have carefully weighed and considered alternatives. They have shown commitment to a district-wide approach and have taken their responsibility very seriously. These individuals are: Tom Beck, Linda Brigner, Noel Guitry, Gary Rusk, Keith Schlarb and Penny Ury.

In the last two months, other teachers and parents have stepped forward to help in other aspects of the program. A community education committee made up of John Butterfield, Philipp Heer, Jim Leitzel, John Miller, Tim O'Keefe, Nancy Olsen, Tom Rally, Gary Rusk, Penny Ury and Paul Zenisek prepared sessions for continuing education this spring and are planning more for next year.

The Software Evaluation Committee was established in April and eight teachers volunteered to serve. These individuals are: Paula Baur, Melinda Beckwith, Robin Blank, Larry Gary, Dave Morris, Marty Petrucci, Pat Smeaton, Patty Went, and Judy Weston.

The number of staff becoming involved in one or more aspects of the program demonstrate the interest and willingness to take a part in exploration and implementation of a multi-faceted approach to using computers in the instructional setting. This coming year, many more teachers and administrators will be given the opportunity to become actively involved. By the end of the 1983-84 school year, all teachers will have been given the opportunity to use the computer as a tool to strengthen or enhance the curriculum.

As noted earlier, the incremental approach which allows for on-going exploration is designed to provide opportunities for the classroom teacher and administrators to ascertain in a planned way how best the district can take advantage of this technology. Through planned experimentation, preliminary decisions can be made and tested before a full scale commitment or implementation is made. This report is a status and planning document to identify both what we're learned and where we'd like to learn more.

The plans for 1983-84 were shared with the building principals this past week. Several questions were asked but overall the principals are supportive of the effort. The principal's support and involvement are critical to this program.

Similarly, a draft of the report was discussed with the Task Force. These members endorsed the plans developed for the 1983-84 school year. The Task Force members recommended the development of a 'survey' course which should be initiated no later than the eighth grade. This group also would like the district to remain open to using different types of micros when the function would suggest such an approach. Some concern was voiced about teacher preparedness and whether all teachers would be willing or need to learn a programming language.

SECTION I. WHERE WE'VE BEEN

A. Recapsule of Events

During the 1981-82 school year a citizens and staff task force was established to help provide direction in terms of the district's utilization of computers for both instruction and management information services. The task force recommended the employment of Battelle to assist district personnel in the planning and shaping of computer usage.

In the 1982-83 school year, Task Force members were asked to meet and review plans developed by the district's internal planning committee. The internal committee was formed in August 1982 to fashion a K-12 instructional plan and work cooperatively with Battelle to fulfill the tasks required by the district as outlined in the contract with Battelle. In addition the board provided staff assistance by releasing two teachers on a part-time basis to assist with the overall effort.

B. First Steps

The initial task of the internal committee (Computer Planning Team) was the identification of the critical questions involved in defining a district direction. These questions were submitted to Battelle, and Battelle provided a report containing a response to each question and supporting research. Many of the questions (Appendix A) asked for models from other districts that had worked and were successful.

The Battelle report was helpful in providing the team some direction to identify areas in which more in-depth exploration was warranted. After continued study by the Team an overall framework of district expectations was established.

C. The Framework

As one of the first tasks of the Computer Planning Team, initial objectives and goals were identified that would provide a comprehensive district program. The Team identified four different ways in which the computer could benefit students and teachers. These areas are: computer awareness, programming, courseware and classroom management.

Computer Awareness refers to the development of student appreciation and understanding of computer advances including ethics and legal issues as well as advanced technology involved in robotics and artificial intelligence. For the most part such topics are not part of the existing curriculum and would require substantial time and effort to develop. Although these topics are receiving more attention in periodicals and through the media, very few materials are on the market that deal with the teaching of these issues.

The Computer Planning Team refers to these topics as computer awareness rather than using the term literacy which has many different meanings. In the Team's view, computer awareness topics need to be integrated into the curriculum from kindergarten through 8th grade initially. Such topics and the way each is treated will require establishing a scope and sequence. It may also be prudent to consider the potential of extending the awareness activities to required high school courses where such topics have relevance. In Section III of this report an approach is proposed for the development of the awareness activities.

Computer Programming contains two facets. One, the students learn and develop the necessary programming skills to use for problem solving; or two, students develop more in-depth programming skills as the primary focus. The first element would apply to the teaching of a computer language in grades K-8, while the second facet would be satisfied through elective courses offered at the high school level.

The Team believes that all students need some rudimentary knowledge of programming and computer languages but the thrust in K-8 should be in applying these skills. This emphasis in grades K-8 should minimize the establishment of new objectives. Instead, the computer would be used as a tool to help achieve existing curriculum objectives.

Some students will want, because of interest or career objectives, to develop a higher degree of programming proficiency. The high school computer science courses offer students this opportunity; however, as students become more knowledgeable some revisions of the existing courses may be needed.

Courseware refers to the use of software programs to supplement the existing curriculum at all grades and subject areas. The Team believes that all teachers should become familiar with the different types of software such as simulations, tutorials and drill and practice. Teachers will need to develop skills to evaluate software programs and determine whether a software package is appropriate.

Because software is expensive and the quality is often questionable, a software evaluation team has been established and is discussed in more detail later in this section of the report. Using courseware requires no programming skills.

The Team sees using courseware to supplement or enhance the curriculum. In some cases software can be used to introduce a unit or concepts, or to reinforce the curriculum concept or as the major teaching vehicle. The existing curriculum objectives are retained but achieved through a different method.

Classroom management applications refers to the use of computer programs to help teachers in developing grades and tests as well as maintaining individual student records. These examples are a few applications which can assist the classroom teacher.

Generally, prepared programs can be adapted for individual teacher use and require minimal programming skills. Some of the MECC (Minnesota Educational Computer Consortium) materials are designed for this purpose and are being used extensively by some teachers, particularly at the high school.

The four areas outlined above are the areas of concentration. The Team has designed with the help of other teachers and administrators either pilots or methods to address each. Each of these four facets is an important part in developing a comprehensive approach that will provide the best and appropriate utilization of the computer in the educational setting.

D. Next Steps in the 1982-83 School Year

Several events occurred simultaneously that involved extensive time and effort on the part of the Computer Planning Team members. One, the team surveyed all staff to gain a clearer understanding of staff readiness toward the computer as an instructional tool. The survey results showed that a few

staff had substantial inservice or coursework relating to the computer and were using the computer as a tool in the classroom setting.

Two, the Computer Planning Team responded to a request to organize a computer hardware fair as part of the Continuing Education offerings. In late October, about 90 parents and residents attended this session which included: a brief overview of district usage of computers; a display of vendors demonstrating various types of microcomputers; and a demonstration by students using computers.

In late fall, the district because of its affiliation with the School Study Council of Ohio was able to procure software developed by the Minnesota Educational Computing Consortium (MECC). This software, with corresponding documentation was catalogued by the district's media center with appropriate copies made for each school. The acquisition of this software was the first substantial purchase made of commercially prepared materials.

One of the concerns mentioned frequently in the literature with respect to computer usage and education is the lack of quality software. The MECC materials are reputedly some of the best on the market and also have the advantage that copies can be made for use within the district's instructional program. The low cost of the software and its quality made this purchase worthwhile.

Because it was not clear where the software might best fit into the curriculum and the need to evaluate the programs, a series of five inservices were designed for elementary and secondary staff. For the elementary sessions, each building selected four staff including the principal and media specialist. At the secondary level, an effort was made to involve teachers representing the various academic areas. These inservices were conducted during December and January. Participants agreed to continue to evaluate the materials for the remainder of the school year.

Some of the school teams at the conclusion of the seminar series conducted inservice sessions for their colleagues to introduce them to the MECC materials. One of the Computer Planning Team members was responsible for the follow-up and worked with those representing the elementary and middle schools.

Later in the report a more thorough description is given of the pre-and-post survey participants completed as well as the follow-up activities in which they participated. Some of those who participated in the inservice series and follow-up will be involved in an assessment session in mid-June. At that time, decisions will be made regarding the appropriate placement of MECC software in the curriculum and by grade level. In this way, the potential for repetitive use of software can be minimized.

During the inservice session, participants were also introduced to word processing and teacher utility programs. The word processing segment was not sufficient for participants to gain proficiency with this feature. Further or more extensive inservices focusing on word processing will be required.

The teacher utilities are classroom management programs to help teachers construct tests and like materials. The secondary staff, particularly the high school staff, have utilized these programs extensively. There were few courseware materials appropriate for use at the high school level.

In addition to these activities, the Computer Planning Team spent considerable time discussing the merits of various pilots. By December, a decision was reached with Battelle concerning which pilot ideas were of significant value to warrant expenditures and an in-depth investigation.

E. The Pilots

Six pilots were designed. Those responsible for their operation submitted pilot proposals including objectives, design, and costs involved. Two pilots, special education and English as a Second Language, were revised and expanded to include a K-12 focus rather than limiting them to one level.

The six pilots that were undertaken included: high school computer science hardware and language, English as a Second Language, business, Logo, Special Education and the Alternative Campus. The following is a brief description of each pilot.

Alternative Campus Pilot was designed to look at the number of potential administrative and student applications unique to the Linworth Campus. Some of the objectives including providing the opportunity for seniors to have hands-on experience; utilizing the computer for the Walkabout program; and investigating potential use of the MECC materials.

Business Department Pilot was developed to provide opportunities for department teachers to develop some familiarity and proficiency in the operation of the computer; identify and review some commercially prepared software with relevance for business-related courses; and, begin to identify areas within the curriculum that can be positively impacted with the incorporation of software.

High School Computer Science Pilot (hardware and language) was instituted to determine the effectiveness of a new hardware configuration to replace existing equipment. The second facet of the pilot involved the exerpimentation of Pascal, a computer language in the advanced computer science course since this language is now used for college placement.

English as a Second Language Pilot is designed to begin to look at software that would help students learn specific skills and concepts more readily while also studying student reaction to using the computer as an instructional aide.

Logo Pilot was developed in an effort to ascertain the appropriateness of this language for children in grades K-3. In addition, the pilot involved several other objectives including: identify teacher and student receptivity to learning, using and applying the language concepts; and beginning to determine what ways the Logo language can be integrated into the existing philosophy and curriculum at these grades.

Those responsible for the pilots were informed and agreed to present preliminary findings in late March to the Computer Planning Team. The next section of this document is a presentation of the preliminary reports including information concerning their findings, conclusions and recommendations.

The Computer Planning Team has taken these recommendations under advisement in determining whether the pilot should be continued, discontinued or expanded. Section III of this report contains the recommendations of the Computer Planning Team for these pilots and those proposed for the 1983-84 school year.

F. Community Education

Because the district is attempting to institute a holistic computer educational program for its students, it is vitally important that parents and residents of this community have opportunities to become acquainted with the uses of computers and how the district plans to integrate them into the program. Two members of the Computer Planning Team head up the Community Education Committee which includes three members of the Task Force and several other parents and one administrator.

This group began meeting in spring 1983, and determined that as a group their primary focus would be to offer educational opportunities related to the computer for parents and residents. Informing the community about the district's program would be the responsibility of the district and each school. With this matter decided, the group planned and conducted a three session program through Worthington's Continuing Education program. The first two sessions included: a brief history of computer technology; an introduction to computer technology; a discussion of the potential effect of computers on individuals and institutions; and demonstrated application of computer technology.

At the third session, computer vendors were invited to display their hardware. Approximately 50 participated in these sessions. Based on the questionnaires completed by participants the community education group plans to offer more sessions during the 1983-84 school year. Some of these sessions will be designed for the novice to gain some basic understanding of computer technology while others will be geared to providing hands-on programming experiences.

G. Software Selection

A process to identify quality software that will supplement and strengthen the existing curriculum was recognized as an immediate and on-going need. Because commercially prepared software is often expensive, it is incumbent upon the district to be careful in its selection of such materials.

The Computer Planning Team believes that software which is purchased for a particular subject or grade level needs to be made available to all children who are studying that particular subject area. For that reason initial purchases

of software will be made to correspond with existing curricula and courses of study objectives.

A software evaluation committee has been established which will be responsible for obtaining, reviewing, evaluating and recommending software purchases. The committee includes: four elementary and four secondary teachers along with the district's media specialist, the curriculum coordinators and one member of the Computer Planning Team. A process was developed by which to proceed systematically with the procurement and evaluation of software. The ten step process includes opportunities for staff members to use software packages with their students followed by an evaluation of that software package.

This group will begin to function in an on-going manner with the 1983-84 school year. Provisions include the rotation of members with no member serving more than a two year term.

H. Policy Statement

During the course of this year the Team has realized that many questions and concerns need to be addressed through board policy. Both broad and philosophical statements are needed concerning the board's beliefs about computer usage for instruction.

Some of the issues that need to be included in such a policy deal with copyright law, appropriate use of software and hardware by staff, students and parents, responsibility and liability for use and misuse of software and equipment. At this time, the beginnings of such a policy are being drafted.

SECTION II: WHAT WE'VE LEARNED

A. Introduction

This section of the report is divided into two parts. One section includes the findings, conclusions of the pilots; and the second provides a detailed account of the MECC inservice, particularly the follow-up activities.

Those responsible for the pilots submitted reports to the Computer Planning Team. The recommendations of the Computer Planning Team regarding each are found in Section III of this document.

B. Preliminary Reports of the Pilots

1. Logo Pilot

The Logo language has been developed over the past twelve years at MIT under the primary leadership of Seymour Papert. It is essentially a dialect of LISP (List Processing), a powerful language developed for research in artificial intelligence.

Logo, unlike other computer languages, is intended to be a language for learning. It was developed to be simple to learn, but provide a rich and easily expandable vocabulary. Additionally, it had to reflect ideas in computer science, such as procedurization, local and global variables, self-referential programming, etc. Essentially, Logo allows beginners to write simple programs that do something interesting.

Logo is not just a programming language; it is also a philosophy of education. This philosophy is expounded in Seymour Papert's Mindstorms: Children, Computers, and Powerful Ideas (New York: Basic Books, 1980). Much of Papert's philosophy ties in to Piagetian approaches to learning.

Pilot Background

The Computer Planning Team (CPT) recognizing the increasing national interest and attention that Logo use with elementary children is receiving decided to undertake a major pilot to determine to what degree Logo should be incorporated into a K-6 computer curriculum. The CPT further resolved that a comprehensive literature search be conducted to establish a broad base of information on the Log language.

Of the five implementations of Logo currently available for micro-computers, Krell Logo was selected for piloting after a technical comparison review. Krell Logo offered full language capabilities (both turtle graphics and list manipulation), good documentation, trace capability, clear error messages, and the ability to interface with Assembly language routines.

Pilot Design

The Logo language pilot involved one primary teacher from each of the district's seven elementary buildings. The selection of these teachers was based on interest, grade level, and building. This process yielded a group consisting of two teachers per level at 1-3 and one kindergarten teacher. The arrangement provided approximately 200 children an opportunity to work with Logo in their classroom.

The pilot was designed to provide each teacher training in the Logo language and its attendant philosophy. Each teacher then implemented Logo into their classroom maintaining a daily log of the children's activities and progress. The pilot teachers meet on a bi-weekly basis to exchange ideas, resolve problems, and explore new directions for development.

The pilot was intended to address the following objectives:

Primary Objective: Determine the appropriateness of the Logo language for children grades K-3.

Subordinate Objectives:

1. Determine the potential of Logo for intermediate-age children.
2. Establish an initial scope and sequence for each grade (K-3) using Logo.
3. Create procedures for teacher training in the use of Logo and its attendant philosophy.
4. Determine the compatibility of Logo and its philosophy to the district's general philosophy and curriculum objectives.
5. Assess the suitability of Logo for creating software for curriculum areas.

Pilot Teachers

Each of the seven pilot teachers are experienced classroom teachers who have had previous inservice experience with micro-computers. Typical experiences were Dr. Shumway's district inservice course, building inservices conducted by colleagues, and the PRIME summer workshop. Classroom use of micro-computers ranged from none to simple instruction to BASIC and limited instructional software. Six of the seven teachers had no knowledge or experience with the Logo language. One had a theoretical exposure to Logo through a university course.

Pilot Teacher Inservice

Each pilot teacher received fourteen hours of inservice with the Logo language prior to implementing it into their classrooms. This inservice training was conducted over a two-week period on three separate days. Between training sessions teachers worked at home with the computers to develop proficiency with the concepts presented during the inservice.

The fourteen hours of inservice were intended to develop the following Logo competencies:

1) Logo language structure
2) Turtle graphic commands
3) Use of variables and recursion
4) Developing and using procedures
5) Screen modes (text, edit, and graphics)
6) Use of Logo File System
7) Cursory introduction to word and list manipulation
8) Overview of Papert's Logo philosophy

The pilot teachers meet on a bi-weekly basis for two to three hours. These sessions are used to introduce new topics for exploration, discuss difficulties or concerns, exchange ideas, and provide group support.

Pilot Findings

a. Pilot Teacher Receptivity and Use

All seven pilot teachers have demonstrated a high degree of enthusiasm for the pilot. They have found Logo to be a relatively easy language to learn and initiate with their children. They also recognize the full language capabilities of Logo and have expressed a need to continue their exploration and develop their mastery to realize Logo's full potential. The pilot teachers have been impressed by the receptivity of their students and the independence of the children in working with Logo. They are excited and encouraged by the problem-solving behaviors demonstrated by the students.

The pilot teachers initially reported they were spending ten to twenty hours a week preparation to use Logo in their classrooms. Currently, teachers are reporting one to two hours per week in preparation.

Each teacher is spending approximately an hour a week in whole group instruction. This instruction time is being subtracted from a variety of instructional blocks including math and language arts.

The greatest concern expressed by the pilot teachers is a lack of time to monitor and work with individual students while they are working on the computer.

b. Student Receptivity and Use

The pilot teachers have reported strong receptivity and excitement by the students in their use of Logo. Of the approximately 200 children being exposed to Logo less than five cases have been cited by the teachers of children showing no interest in working with the "turtle." The teachers have reported that their rooms are reverberating with "turble talk." The children have coined a number of "turtlisms" like "turtle time" (their time to use the computer) and "turtle toy" (any toy used to simulate the screen turtle). The teachers have noted a high degree of positive interaction between students as they encourage and support each other to resolve common Logo tasks.

In each of the seven buildings the children have worked in pairs on the computer. Each child has been receiving approximately an hour of computer time per week in addition to whole group instruction time with Logo. All teachers have cited cases of parents inquiring about obtaining Logo for use on home computers. Many parents have visited their child's classroom to observe or gain more information on Logo.

The teachers have reported that the simplicity of Logo's initial commands has permitted every child to work with Logo. The children are rapidly differentiating in ability to comprehend and grasp greater Logo concepts.

Pilot Conclusions

Primary Objective: Determine the appropriateness of the Logo language for children grades K-3.

1) Logo's turtle graphics have proven to be highly appealing and motivating to young children.

2) The simplicity of initial Logo commands and ease with which they may be entered has led to a high success rate for the children.

3) Logo has proven to have tangents in other curriculum areas; particularly problem-solving, thinking processes, and mathematics.

4) Logo's capability to create procedures which can be utilized by the student as if it were a primitive permits students to explore problems of greater complexity.

5) The use of Logo within the classroom has encouraged positive and supportive social behaviors in the children.

Objective: Determine the potential of Logo for intermediate age children.

1) Primary age children have not been able to utilize the full range of the Logo language. The following concepts appear to be appropriate for older children.

   a) The use of multiple variables.

   b) The concept and use of recursion.

   c) Number, word, and list manipulations.

   d) The use of input commands.

2) Problems and topics that would require advanced Logo concepts appear to be better suited to older children.

Objective: Establish an initial scope and sequence for each grade (K-3) using Logo.

1) A general sequence of concepts has surfaced as appropriate.

2) It is too early to determine specific concepts per grade level.

3) The development of a specific sequence should be flexible to permit varying ability children to progress at their own rate.

4) Preliminary explorations have not been sufficient to allow pilot teachers to test all possible concepts that might be appropriate to a scope and sequence.

Objective: Determine the compatability of Logo and its philosophy to the district's general philosophy and curriculum objectives.

1) The exploratory-discovery nature of Logo is compatible with other established curriculum areas; in particular, the elementary school science curriculum and the new directions being explored in the mathematics curriculum.

2) The inherent problem-solving and thinking processes inherent to learning Logo is deemed to be compatible with objectives in other primary curriculum areas.

Objective: Assess the suitability of Logo for creating software for curriculum areas.

1) To use Logo to create software would require greater inservice training and experience for staff.

2) Logo's limited workspace is inappropriate for creating lengthy programs.

3) Logo does not have a good way to create or manage data files.

4) Logo is not intended to be used as a programmer's language.

Objective: Create procedures for teacher training in the use of Logo and its attendant philosophy.

1) Sufficient inservice training is necessary prior to classroom implementation including adequate opportunities for structured exploration.

2) Greater emphasis should be given to developing classroom strategies.

3) Increased inservice time should be allowed for the discussion of the Logo philosophy.

4) Support group meetings after classroom implementation is necessary to exchange ideas to resolve common problems and to encourage new explorations.

Pilot Recommendations

Preliminary pilot conclusions indicate that Logo should be developed as an introductory programming language for the primary grades (k-3). As a part of this development it is encouraged that the current pilot teachers be allowed to work with Logo through the first semester of next year with the primary objective of creating a specific scope and sequence of activities and Logo concepts. To support this objective the search and procurement of Logo instructional materials and contact with national Logo organizations should be continued.

It is recommended that seven teachers in grades 4-6 be trained in the Logo language to determine how and to what extent Logo may be used in the intermediate grades (4-6). These pilot teachers should be selected prior to the conclusion of this school year and receive inservice training during the summer. During the first semester of next year these teachers will implement and explore Logo in their classrooms.

Additionally, a part-time limited project coordinator's position should be established to provide inservice training, coordinate the development of a scope and sequence in grades K-3, lead support group sessions, and provide technical assistance to pilot teachers. The project coordinator would also assume responsibility for reporting results of the project to the district computer coordinator and the Computer Planning Team.

The following plan is recommended for the continued development and integration of the Logo language into the elementary grades.

May '83	One hour presentation of the Logo language for interested intermediate grade teachers.
June '83	Select seven intermediate grade teachers to pilot Logo.
August '83	One week training session for seven intermediate pilot teachers.
August '83	Two day workshop for current primary pilot teachers.
Sept. '83	Intermediate pilot teachers implement Logo into their classrooms. Primary pilot teachers continue their exploration of Logo.
December '83	Evaluate the use of Logo in the intermediate grades.
January '84	Initiate and train fourteen new teachers in the use of Logo. (Seven primary and seven intermediate teachers)

2. Special Education Pilot

An Apple II computer was shared by the two L.D. resource rooms from January 24 until March 7, 1983. The following explanation is in response to your letter of March 8, 1983.

Pilot Design

The computer was used five hours daily during class and was made available before school and at lunchtime for those students who would not have had exposure otherwise. In the English resource room spelling, vocabulary and punctuation skills were taught during one half of first and all of sixth and seventh periods.

Each student was assigned a MECC Spelling lesson based on skill level. They used it twice, once as a pretest and later as a posttest at the end of the week. The words missed were typed three times and written on their record sheet. It took approximately eight minutes to complete a twenty word list.

On Tuesday, Wednesday, and Thursday English students worked on Milton Bradley software on vocabulary and two punctuation disks. These are areas in which the students needed to improve skills, but they were unmotivated when asked to practice skills using conventional teaching materials. These disks had pretests, and introductory worksheets were included if needed. Each disk had a teacher record keeping section, practice lessons, and mastery tests.

The Apple II computer was used in three subject areas for six weeks in the learning disability resource unit at the high school. A total of 23 students were exposed to the computer. Seven math, eleven U.S. history, and five world history students used it during the first three periods of the day.

A pretest was given to math students. Results showed all students should continue to review basic facts, units of measurement and estimation of numbers. Math students spent the first week on estimation of numbers. They used the computer during the second, third and fourth week to review basic facts. The last two weeks were spent learning various types of measurement.

U.S. history students were given a pretest checking their knowledge of states and capitals. The program broke the states into geographical areas. Students were able to master one area before moving on to the next section. When success was met, students could use problem solving games such as "Oregon" and "Civil War".

The World History students followed the same basic schedule. However, they concentrated on continents of the world, countries and their capitals.

Findings

Our pilot's scope was narrowed to six weeks, therefore we were unable to fulfill all of our early goals. We did learn the following things:

1) Many first-time, reluctant computer operators are now "hooked". Some of our students were afraid of it, expressing that computers were for people in advanced programs. They changed their opinion quickly.

2) Students with short attention spans who had been easily and often distracted became "tuned in" to the computer programs. They would refuse to answer questions of friends or respond to classroom activity. New behaviors did not carry over; they have reverted to previous behaviors since Apple II left. A minor administrative task was to make sure that they stopped to relinquish the computer to another when asked by the program, "Do you want to do the next exercise or see your teacher?"

3) Students were willing to work on skills which were "boring" to them otherwise. They enjoyed the format of the software and the immediate feedback which either affirmed their answer or corrected the response.

4) The majority of our students dislike writing, both composition skills and physically writing. They didn't consider typing individual words and moving rockets to insert punctuation a chore.

5) Students learning or reviewing basic information and skills considered them to be on their level or "sophisticated" when presented on a computer.

Conclusions

1) The computer and the software programs highly motivated the students to do work. In our six week sample, the interest level remained very high.

2) Students were not as easily distracted by other classroom activities when they were using the computer.

3) Using teacher observation, we noted that students who normally could not complete a task without interruption were able to complete computer assignments.

4) Within a class period in the high school resource room, we find ourselves teaching up to three different content areas. The computer provides the necessary immediate feedback which students would not otherwise receive. They were willing to accept correction of errors in a more positive way because it was coming from a neutral source.

5) We found the computer to be an excellent tool to use for introduction, practice and a variety of reinforcement of basic subject matter.

6) The one negative aspect was the limited availability of programs for high school learning disability students. With a longer lead time, we are sure that we could find, adapt or create appropriate programs.

7) We now know how valuable a computer can be in our classrooms; we miss it.

Recommendations

We have found the computer to be a valuable addition to the resources which can be made available for our learning disability students. We would hope that the district would agree and make one available permanently in our rooms. Additional software will be needed.

The following are some of our students comments and responses in terms of how they viewed the use of the computer:

. "The apple computer was very interesting because we learned our states. But we also got to do intellectual stuff too. I think this training is valuable for all ages because high technology jobs require computer knowledge."

. "I thought the computer was a great idea! I really liked it alot. I worked on the United States. Before I worked on the computer I didn't know but 4 states, and now I know all but the England States. I did not have time to work on those. I wish that we had more time on the computer because I loved it."

. "When I used the computer I liked it very much. I think using a computer the student gets more involved with what he or she is doing so they put forth more effort in what they are doing. Like states is what I did and I would have to type in the command then find out the states. Then as each state came up I would learn where the state is located and the spelling of the state so I concentrated more and I learned much faster than normal. I am glad I had the chance to work with the computer. But the only thing wrong is that I did not get to use it as much as I would like to have. It was a big help."

. "I like working with the computer because I like to type. I concentrated better. What I dislike about the computer is we didn't have enough time to work with it."

. "I like the computer because you don't have to ask it "what". It was easy to learn from. I made improvements in my learning from the computer. The only thing I hated about it is I didn't get to use it very often. I think we need more computers in our schools. I like it because you can learn what you need or want to learn from it."

. "I liked the computer. I liked the challenge because you only have a certain amount of time to answer the problems. The only thing I didn't like was that it gave too many directions and I didn't get to use it enough.

. "My experience with the Apple Computer was very exciting. When I first started out working with the computer I was really frustrated. I couldn't do anything right. I couldn't type right or anything of the sort. My teacher told us to stick with the computer, and she gave us the best decision. The class worked with the computer everyday, and I began to enjoy every moment it was here. We finally got the hang of it and then it was a cinch. My experience with the computer personally was very enjoyable, and I would love to take it home. It helped me learn what I really needed to know and things that I was embarrassed to even ask a teacher because I'd think they would think I was underdeveloped in my education."

. "The Apple II plus I thought was a very good learning experience. It was much more enjoyable than hearing the lesson. I thought that the lesson went much faster than it usually would. I thought it was very beneficial. There is nothing I did not like. Plus I think I learned alot more. I think we should definitely have one. The only bad program was the comma program. I did some lessons that I normally would complain about."

. "I liked the Apple because in a way it really taught me alot of English and Social Studies. My favorite game was Furs, when you traded furs for money. The Apple is a good thing, and I would like to be able to use it again some day. It was also easier because you did not have to write down anything, because also I hate to write things down."

. "I really like the Apple. I thought it was very neat. I am glad our class to to use it. I just wish we could have it alot longer. The only thing I didn't like was the history. I don't think it was just the Apple. It's just that I hate history. Some of us would argue about who was first, who was next. I also liked it because you didn't have to write. It was my first experience working with the computer. It was really great. Can't we have it back?"

. "Personally, I have trouble getting to work. With the Apple I could get to work. Normally I would stray away from some lessons but the computer made it fun and easy to learn. I think we need a computer for this program."

3. High School Computer Science -- Hardware and Pascal

a. Response to Pilot Questions

Question #1: How does the processing time of the Nestar micro-network compare to the HP mini-computer? Are these differences, if any, sufficient to present problems in the programming classes?

Response: Access time for DDS is slower than using the mini-computer but does not appear to be a problem. This observation is based on seven (7) networked micro-computers and access time will certainly increase as more micros are brought onto the network system. Access time for the Pascal operating system is much slower due to the compilation required for the language. No comparison can be made to the mini-system since Pascal was not resident on the HP. It is anticipated that the addition of micros to the network may increase the access time required, and the additional delay is of some concern.

Question #2: Does the network overcome the problems experienced in the fall 1982 pilot with non-networked micros?

Response: The large storage capability of the network system resolves the problems encountered by the non-networked micros in terms of operating system and workspace for the Pascal and Fortran languages.

Unanticipated Problem: In structuring the original format of the disk, the thirty-three (33) megabytes of storage seemed sufficient; however, as of March 1 the full capacity of the disk had been used. Re-allocation of disk space should alleviate the problem for the remainder of this school year in terms of student use and limited staff use. If the current enrollment level holds for the 1983-84 school year the disk capacity should be sufficient. Other alternative solutions to this problem are currently being studied.

(The Nestar operating system with its demonstration programs and libraries occupies approximately three (3) megabytes of storage. The manager files and guest user files uses another two (2) megabytes of the disk. Each class of twenty-four (24) students requires about 3.3 megabytes of storage. This leaves about ten (10) megabytes of disk for all other uses including additional space for advanced programming classes, independent studies projects, the Geometry computer unit and the enrichment activities of the Enriched Algebra II classes. While the current use level can be supported on the system with efficient planning, there seems to be little possibility for program expansion unless all stations are equipped with drives to permit off-network use for the introductory classes.)

Question #3: How difficult is the system to operate? (from standpoint of the teacher and the student)

Response: From the teacher/manager perspective, the system does not appear to be difficult to operate. Not all capabilities and features have been used at this time. Manager training sessions have centered on the user manual section for establishing file structures and security. The other capabilities are addressed in the system manager manual. From the student viewpoint there is no significant difference between the mini and the networked micro operating system for BASIC. Since Pascal was not resident on the mini system no comparison can be made. The network certainly alleviates the problem of handling several floppy disks with the non-networked micros.

Question #4: Does the network provide for easy and regular backup?

Response: The backup procedure for the network is easier but takes considerably more time than on the mini-system. (It takes approximately one hour to back up the disk.)

Question #5: How difficult is the system to maintain?

Response: At the present time only minor problems have been encountered. Insufficient experience does not permit a judgement at this time.

Question #6: Does the network system provide the necessary flexibility to run multiple languages with minimal student interaction?

Response: Student access to different languages on the network system is a very simple process from the student perspective. (Maintaining different languages on the network system must be addressed in regard to copyright regulations. For example, to put Fortran on the system would require a license and an additional cost based on the number of user micros on the system.)

Question #7: Does the network provide for necessary security on files?

Response: At this time, only limited security has been incorporated on the system. It is felt that the security level available on the system will be sufficient for our purposes.

Question #8: How many actual micros are needed to teach the computer science courses?

Response: Based on experience as well as current literature reviews, it is felt that one micro for each two students is very desirable for such courses. At the current level of twenty-four (24) students per class, twelve (12) student stations would be needed. If, however, it becomes necessary to have more than one class during the same time period, additional stations would have to be added.

Question #9: What other possible future uses exist for the network?

Response: The capability of the network would permit shared storage with the business education department and/or some limited building level administrative functions. It would also be possible to serve other locations

outside the building through modems and telephone lines. To provide for this expanded use, additional hardware would have to be added to the network.

Recommendations

- To more completely evaluate the micro network system it is necessary to expand the network to include at least twelve (12) user stations.
- To provide private access for system file maintenance one additional user station with a disk drive is required.
- To provide for special applications in the computer science courses a graphics tablet and plotter should be added to the system.

Hardware needs for implementing recommendations include the following:

Six Nestar network interface cards; three Apple printers (w/Grappler + interfaces); two Disk II drives (w/interfaces); one Plotter with interface; and one Graphics Tablet (w/interface).

b. Language Pilot

At this time we concur with the current literature that Pascal language programming should be offered at the high school. It offers a structured programming approach not present in BASIC. Pascal is the only language currently supported by the College Board-Testing Service.

BASIC language programming should continue to be offered until such time that nearly all students entering high school have had previous experience in BASIC language programming. Even at that time some provisions must be made for students moving into the district and for providing basic skills for students planning to enroll in an applications course.

At present, Fortran language programming should be offered on an independent study basis. Fortran as well as assembler and other specialized languages could be offered as an option within the Advanced Computer Programming course. Unless there is a greater demand for these languages, students would be able to use off-line micros to run their programs. If the demand should increase it would be necessary to investigate the possibility of obtaining licensing to put the language on the network system.

4. Business Pilot

a. Pilot Design

The computer was used primarily in two areas: Typewriting and Accounting.

The typing teachers reviewed and used "Gregg Keyboarding for Information Processing" which was marketed by Gregg/McGraw-Hill. The software was used mainly for drill and practice over material that had been previously presented in class. The teachers and students both felt that the exposure to the computer and typing was beneficial. All of the teachers felt that the students enjoyed working on the computer drill material and gained additional mastery over the keyboard from its use. Many students would give up their lunch hour to further try to improve their typing skills. It was felt that the software used was excellent.

Two students have been working on an independent study involving the use of the computer and accounting. The students first worked on "Microcomputer Accounting Applications" a software program produced by Gregg/McGraw Hill. The students covered all four areas: General Ledger, Accounts Receivable, Accounts Payable, and Payroll. They found the program very difficult and hard to understand. The program gave the students a thorough understanding however, of the relationship between accounting and the computer. At the present time the students are working on the MECC Accounting Materials. They have mastered the General Ledger Program and are currently working on the Accounts Receivable Program. All indications are that this program is far superior to the Gregg program. An evaluation of the MECC Program will be given as soon as the four segments are completed. The last program that the students will be reviewing is "Accounting Plus II", an advanced business accounting system. It is my hope that the students will be able to design and set up the accounting records for a business and then perform the accounting functions for a two-month cycle in that business.

In addition to the above, a payroll program was demonstrated to all of the Accounting I classes. This was particularly appropriate as the students had just studied this area. Several students did a payroll project on the computer and could not believe how quickly and accurately the payroll functions could be performed.

One staff member used the computer in Economics to review the program "Profit and Loss" published by Gregg/McGraw Hill. This program worked well; however, it was felt that the program was too elementary for 11th and 12th grade students. It would probably be used for the 10th graders in Basic Business. The program "Sandwich Shoppe" reviewed by the department seems to have greater applicability for the more advanced students in Economics.

All of the teachers in the business department have experimented with the use of the computer in both the classroom and individually. They found some of the MECC materials available for teacher use very beneficial and helpful.

It should be mentioned that six teachers attended a half-day workshop sponsored by McGraw-Hill in early February to get acquainted with software and the computer. The workshop was excellent and all teachers felt it was very helpful.

b. Findings

There were many questions posed at the outset of the pilot, some of which have been answered and some of which need further study. The following is a summary of the findings.

There is no doubt that the computer is needed and should be an integral part of the accounting program. To adequately incorporate the computer into the accounting curriculum, enough computers should be purchased so that all students could be working on a project at a given time. The ideal situation would be a minimum of (3) students per machine. To meet this objective the accounting students would need access to 10 computers. The pilot did underscore the premise that the students working on the computer must have a sound accounting background to understand the relationship between accounting and the computer. Feedback from the two students working on the independent study

indicated that more thinking was required than by just doing the accounting by hand. In addition, it would be great to have access to a program or programs that could be duplicated. It is our hope that the MECC materials will fill this need!

The computer was a tremendous motivational device for the students that worked on Keyboarding. It was also a great instructional tool. I can envision typing being taught solely on the computer in years to come; however, this would require one computer per student. It is very evident that all students should have some keyboarding instruction no matter what area they will be using the computer. Whether it be accounting, math, science, etc., they will be constantly typing information into the computer. There is not only a need for a strong typing program at the high school, but also at the middle school and possibly even at the elementary level.

The ideal design of a computer installation for business education would be to have 10-15 computers located in a central area for all business classes to use. In this way all classes could schedule the room when needed. I feel it would be a mistake to put them in only the accounting room for example. In addition, a network for the software used would be almost essential. A central location for computers would also permit the redesigning of various programs and possibly the initiation of new programs and courses of study. I can say without a doubt that the computer room would be used daily!

c. Conclusions

The last paragraph above summarizes the conclusions. It is essential that more than one computer be made available to the business department if the computer is to be incorporated into the curriculum.

d. Recommendations

We need more time to study the use of the computer in all areas. The two accounting students need the remainder of the school year to finish their task. There is additional software that each teacher would like to review; for example, "Sandwich Shoppe" in Economics, "Tax Manager" for possible use in Personal Law and Personal Finance, "Accounting Plus II" in accounting plus the remainder of the MECC accounting program. We need to study thoroughly the word processing software for microcomputers. We have only scratched the surface in this area. My recommendations would be as follows:

- Continue the pilot through the remainder of this school year and the first semester of the 1983-84 school year to give all teachers the chance to continue to explore and review new material. The summer months will be especially critical as each teacher will have time to devote solely to software review, etc.

- Purchase two to three additional computers for a gradual rotated approach to the use of the computer in the classroom. Materials could be designed to work with this approach, particularly in typing and accounting. This approach could be repeated until the ideal is reached (a special computer room for instruction in business education).

5. Alternative School Pilot

a. Pilot Design

During the pilot period activities were divided into staff exploration and student projects.

Each staff member had an opportunity to work with the computer during planning periods. Some of the staff also came in on weekends to examine the MECC material. Staff were encouraged to order MECC materials for examination. One project involved a staff member and a student going through the MECC materials for social studies. The purpose of this project was to involve both teacher and student in the assessment of selected material. Some administrative uses were explored but only initially since suitable software is not available.

Although general student use was not encouraged during this pilot period, several specific student projects were implemented.

One senior student wanted to become computer literate before leaving high school. For one period each day, he worked independently with pre-arranged materials and activities. His goal was to become familiar with the kind of information a computer produced and to learn simple programming skills. This project has been very successful.

During our interim study period, several students are working with a math teacher and spending several hours each day learning and practicing computer skills.

b. Tentative Conclusions

. The computer is an excellent device for individual work for students who already have advanced computer skills or who have little or not skills.

. The computer potentially has several applications administratively for the Alternative Program. We are still exploring those.

. We are not sure about the potential use for Walkabout Information or for college guidance. We will continue to explore these areas.

c. Conclusions

We need to continue exploring the potential classroom uses and staff uses. Time was not sufficient to explore all options or to fully implement the activities that had been started.

d. Recommendations

Continue to work with students and staff to develop activities for skill development and for classroom implementation.

6. English as a Second Language Pilot

a. Objectives

The following are the objectives of the English as a Second Language pilot:

- To review software to determine its usefulness for instruction of ESL students.
- To determine the willingness of ESL students to use the computer as a learning tool.
- To determine the willingness of ESL students to stay on task when using the computer unsupervised.
- To determine the feasibility of incorporating the use of computers in the ESL programs.

During the first part of the semester, the computer was at Perry being used by Clara Bunk. Mrs. Bunk's observations follow:

The second six week period involves the use of the computer with elementary ESL students. Maureen Amorose, the reading/ESL teacher at Liberty, is exploring uses for this student level. All Japanese students in grades 2 through 6 (15 students) and one Korean are utilizing these programs. The primary objective is helping spelling and general word knowledge.

In the third, six week period two high school teachers will utilize the computer primarily using the MECC materials.

b. Computer Usage

From January 24 to March 7, 1983 the Apple II was used at Perry Middle School with eight ESL (English as a Second Language) students. The computer was first used only during the moring hours under the supervision of the student teacher assigned to Clara Bunk. The MECC disks and programs were used for this purpose. As the students progressed in their ability to use the computer, they were also scheduled for independent use of the computer during the afternoon hours when the student teacher was not in the building. The amount of time spent at the computer varied with the availability of the time each student had to schedule into the ESL room. The computer was also used some of the time with four Japanese students working with a second student teacher.

Materials Used

We did not find any commericially prepared materials designed specifically for use with ESL students. We did use the following disks from the Elementary MECC Programs: Elem. Special Needs - Vol. 1, Elem. Vol 2 - Word Games, Elem Vol. 5 Prefixes, Spelling Vol. 1 and English Vol. 1 - Parts of Speech. The most useful was Teacher Utilities MECC program, housed at Perry. With this program I was able to use the two basic programs, "Vocab" and "Quest" where I could add words and questions to go along with vocabulary building and language building programs these students were already using.

Seven of the eight ESL students are also in my regular LAD program and working in various lessons in a program called "Wordcraft". I was able to take words from the Wordcraft lessons and plug them into the MECC "Vocab" program where the student could use them for extra drill and practice in Spell 1, Spell 2, Hangman and Scramble programs. This proved to be highly successful with these students. I have no formal documentation, but my observation as a teacher would say that the computer was a great motivator to keep the students working on building their vocabulary and building their self-confidence in using the newly acquired words. After each five lessons of ten words each, the student takes a review test of all 50 words. The ESL students had their first review test in the Wordcraft program during the first week we had the computer and had not used the computer for learning these words. There was a great deal of apprehension about taking the test and the students were then permitted to take the test by having the student teacher or I read the test and the word choices to them rather than taking the test as the other students in the LAD program do - reading to themselves. The next test came about a week before we had to give up the computer. The ESL students asked to take the test just as the regular LAD students do - reading the test themselves. The ESL students not only demonstrated more confidence in their own ability, but each student scored over 95% on his/her particular test. I was able to put all of the words for Wordcraft I (30 lessons of 10 words each) and Wordcraft II (20 lessons of 10 words each) on to one "Vocab" Disk. Thus, this disk would be very useful in the LAD program with all students needing additional work.

Toward the latter part of the time, I had use of the Apple II, I also used the "Quest" program from the Teach Utility Disk. We designed questions to go along with either the English Alfa or English for Today books the ESL students are using. We used two formats of questions. In the first one students had to choose one correct answer from three choices by just typing the letter a., b., or c. for a grammatical construction question. The student was then immediately told whether or not he had made the correct choice. In the second format, the student had to type in the correct grammatical choice for a short construction problem and was again immediately told by the computer whether or not he had made the correct choice. The "Quest" program took much longer to program and could not be reused in as many varied ways as the "Vocab" program.

Time Spend with the Computer

During the time the computer was at Perry, I personally spent 60-80 hours learning to use and add programs to the computer disks. This time was primarily spent after school hours and on weekends. The student teacher spent a total of about 40-50 hours during school time supervising the students using the computer and each student averaged a total of about an hour at the computer part supervised and part unsupervised.

Comments on Computer Usage

. The computer is an excellent tool for extra drill by students on their own in spelling and grammar concepts.

. To improve or add to conversational skills for ESL students, a teacher must work with each student to verbalize material on the screen and add to it with oral questions.

. Material is quickly obsolete so that it is very time consuming to keep adding current materials to disks.

. Some programs are very good but too limited, with not enough additional drills as the "Parts of Speech" disk available to us.

. Students were excited at the beginning and did not lose interest in working with the computer so their attention span and receptivity were good.

. Using the sequence of "Spell 1", "Spell 2", "Hangman" and "Scramble" in the "Vocab" program served to establish words firmly in the students minds.

. Cartoon illustrations as provided in some disks were a great help to the students understanding.

. The computer would be a great reinforcer if materials were prepared from a text series used by students such as English Alfa.

. Time spent with ESL students and computers showed me that a computer would be a valuable addition to the LAD program where students need much additional work in vocabulary and language development.

Conclusion

My experience with using the computer with ESL students has been very positive. I cannot judge whether or not it is cost-effective since I have no experience in doing this analysis. I have personally gained valuable experience from participating in this pilot and I'm sure the ESL students have profited from the time spent at the computer. We would like to see a computer become an integral part of this program.

c. Usage and Materials -- Elementary Level

All Japanese students in grades second through sixth and one fifth grade Korean student were included in the program. Each student was given instruction on how to use the computer. Students could use the computer individually or in small groups. The computer was located in the Library-Media center and was available to the students throughout the day. Although the Media Specialist was available to assist the students, no one directly supervised the use of the computer. The Media Specialist reported that while she did nto keep a record of the use of the computer, she could say that it was used frequently and that its use created a lot of interest. Often an ESL student would use it with an American friend. Also, when the ESL students were using the computer, many other students would gather around.

The Spell and the Mix-Up programs from Elementary Vol. Two, Version One of the MECC material were programmed with the student's vocabulary lessons and were set out for student use. The students, however, often chose other MECC materials, such as Odell Lake (EL. Vol 4) and Catepillar (El. Vol. 7). While these materials were not specifically designed for the ESL students, they did involve reading English and responding correctly to what was read, and so I feel they were of value as learning tools.

General Observations

. The pilot program was enthusiastically accepted by students and classroom teachers.

. The students were motivated. They enjoyed using the computer.

. The computer created a shared experience for ESL students and American students. Conversations and cooperation developed as students used the computer together.

. The computer provided a valuable educational activity for ESL students who often cannot do what the rest of the class is doing.

. ESL students often can't read the directions given on the MECC materials, and so they need to have someone explain them. (This could be another student.)

. Some supervision is necessary to ensure that the computer is used as efficiently and effectively as possible.

Summary

The pilot program was enthusiastically accepted by ESL students and classroom teachers. Students enjoyed using the computer and used it frequently. Use of the computer encouraged conversation and cooperation with other students. Adult supervision is necessary to ensure that students make the best use of the computer.

Other Comments

I attended the TESOL (Teachers of English to Speakers of Other Languages) conference in March. I went to several sessions on computers use, and I examined some software designed for ESL. Some conclusions:

. You cannot learn a language from a computer. You must hear and speak it to really learn it.

. Computers can be used for drill or word games. However, there are other, less expensive ways to do this.

. Word processing is probably the most exciting and valuable way to use computers in ESL classes.

. ESL software is mostly drill. If this is the only thing you use the computer for, cost should be considered.

. Most ESL software is still in the developmental stage.

Recommendations

I would like to see this pilot continued next year. We really did not have enough time to explore fully the benefits of the computer for the ESL program.

Also, we now have a full time ESL aide who can provide the supervision that is needed. I would also like to learn to use the word processing program so that I can teach the ESL students to use it. I agree that you cannot learn a language from a computer. However, I do think it can provide motivation and opportunities for cooperation and interaction with other students. I also think the word processor can help students learn to understand and manipulate language. I would like to explore this area further.

C. MECC INSERVICE

1. Background

During the first semester the Computer Planning Team provided fifteen hours of inservice to the MECC Software Team members including principals, media specialists, Special Education representatives and teachers. A total of 68 attended these sessions. Participants were given released time for some sessions while stipends were paid for the Saturday meetings.

The four inservice sessions focused on MECC software materials for students, teacher utility programs, and Apple Writer II, a word processing program.

The MECC Software Team members were to:

1. Assist other teachers in becoming aware of the uses of the computer as an instructional tool;
2. Plan and implement computer inservice programs in their respective building;
3. Assist other teachers in examining and evaluating instructional software;
4. Act as a communication link between the Computer Planning Team and their respective building;
5. Assist the Computer Planning Team in refining the inservice program and determining future inservice needs;
6. Assist in developing curriculum guidelines for integration of computers in the instructional program.

Questionnaires were completed by the participants at the initial and final sessions of the workshop. The questionnaire was designed to serve as an evaluation for the inservice sessions and also to identify the need for future inservice sessions. Appendix B contains the results from the pre and post questionnaires. In general, participants gained greater understanding of the potential use of the computer as an enhancer of classroom instruction.

As part of the inservice, 13 micro computers were purchased. Between sessions and at the conclusion of the inservice, each elementary and middle school received one computer while the high school received four computers for the duration of the 1982 - 83 school year.

2. Inservice Design

The MECC inservice was designed to fulfill the six objectives listed previously. The descriptions which follow reflect how activities were designed to achieve each objective.

Objective One: Assist other teachers in becoming aware of the uses of the computer as an instructional tool.

The MECC Software Team teachers were responsible for scheduling the computer at their respective building. Every classroom teacher had an opportunity to use some of the MECC software with their students. When the PRIME computers were available they were used by the teachers and students in a laboratory setting for the evaluation of the MECC materials.

Objective Two: Plan and implement computer inservice programs in their respective building.

The team members from each building held inservice meetings for staff members. The staff inservice consisted of meetings held by grade level, subject area, or a total staff presentation. The teachers were instructed in the type of materials available, equipment handling and care, and the evaluation system to be used. (See Appendix C for evaluation for used).

Objective Three: Assist other teachers in examining and evaluating instructional software.

Team members provided assistance to staff members by scheduling equipment, suggesting uses for software as designated by MECC, and by providing teacher demonstrations. Evaluation forms were distributed by team members. The MECC materials were evaluated by teachers as they were used by individual students or with groups of students.

Objective Four: Act as a communication link between the Computer Planning Team and their respective building.

The MECC team members met monthly with a Computer Planning Team member to discuss and share information regarding the progress of the programs within their buildings. These meetings provided a forum for discussion regarding the software support materials and equipment configuration.

Objective Five: Assist the Computer Planning Team in refining the inservice program and determining future inservice needs.

The participants of the Computer Inservice Program offered several suggestions for the inservice program and indicated future inservice needs through their answers to a pre and post questionnaire.

Objective Six: Assist in developing curriculum guidelines for integration of computers in the instructional program.

Two work sessions for representatives of the MECC Software Team and a media specialist are scheduled for June 13 and 14. The sessions will be used to determine how the MECC materials will be integrated with the present curriculum. Guidelines for MECC software will be established. Some needs for additional software may be determined. Suggestions for use of the materials and equipment configuration will be discussed.

3. Findings

The findings reflect the two aspects of the MECC project. One, the results or findings from the inservice itself, and the second involves the outcomes from the meetings held following the inservice in which participants utilized the software at their respective buildings.

a. Inservice

Findings from the pre and post questionnaires completed during the inservice are as follows:

- The workshop facilitator and the workshop organization were commonly cited strengths of the sessions.
- One-half of the elementary participants suggested more sessions would have been helpful.
- Ninety percent of the high school participants felt they possessed sufficient background to lead inservice sessions for others.
- The most frequent improvement cited was the need for more computers or fewer participants at the sessions.
- Participants agreed further inservice was needed to work with word processing.

b. Follow-up to Inservice

Although the time period focus of the MECC software was limited, teachers were able to provide the necessary inservice to their staff members. In the case of the elementary schools, each level had access to the computer for a total of about ten days. With this time period, only one or two programs could be piloted at a grade level if many students were to be exposed to the material available. As a result of the use of MECC materials in the respective school, the following statements can be made.

- Most teachers, after the inservice sessions, indicated they would be able to use the computer as a tool if the software and support materials were provided.
- The team members were receptive to the use of computer software within their classrooms.
- The teachers completed evaluations for the MECC programs used with students.
- The availability of a single computer for hundreds of students limited the number of students who were introduced to the MECC materials and the number of MECC programs that could be used with students.

- The teacher utility programs were used by teachers and students to create curriculum materials.

- When the PRIME computers were available they were used as a MECC computer laboratory for large groups of students.

4. Conclusions

The following are the conclusions reached by the computer planning team with respect to the MECC inservice and follow-up.

- The inservice and support from the MECC software team members within their respective buildings made a major impact on the use of the computer within the classroom.

- Many teachers who had never worked with a computer were able to use the MECC materials in their classrooms with students.

- The MECC software needs to be evaluated by staff members with students. The evaluation should be conducted at the appropriate subject area and grade level.

- As a result of the MECC inservice, teachers are now able to identify areas of the curriculum in which there are software needs.

- When software is selected, teachers feel it is essential for materials to support and enhance the existing curriculum.

- Participating teachers needed more access time to the computer for students to use the MECC program.

- Use of the teacher utility programs limited by the availability of computer time.

- Almost half of the participating staff had no previous "hands-on" experience with a computer but found that by the end of the in-service they felt more confident in using the computer and software with fellow staff members and students.

- Inservices at the building level, led by their own staff members, were productive and seemed to result in teacher willingness to experiment and evaluate MECC materials.

- Teachers involved in the inservice and the follow-up have accepted the importance of the computer as a teaching tool but are concerned about the availability of hardware and software for their disposal.

- Participants expressed their willingness to continue participating in this program should it be extended.

5. Recommendations

- Consistent district standards for evaluating software need to be developed. The teachers who evaluated the MECC materials were not aware of other software that is available. Inservice should be available to teachers so evaluation standards are consistent.

- A software committee will be necessary to establish guidelines for purchasing computer materials and software. Selection and evaluation of materials as well as purchasing should be consistent throughout the school district.

- More computers are needed if students are to profit from exposure to different types of software which are available.

- More indepth inservice is needed to help teacher use of the teacher utilities software and word processing.

- The packaged programming materials were not used as a part of the original inservice for teachers due to the time factor and available equipment. When more equipment is available this part of the MECC material should be evaluated.

- Would continue the team concept for additional inservice with at least two staff members from an elementary building attending all the sessions and with representatives from the subject areas from the middle and high school.

- Need to insure that from the outset teachers are aware of the expectation they are to fulfill during and following inservice.

- The number of participants in both sessions was too large. In the future, sessions should be limited to two persons per computer.

- Buildings should be permitted to continue to use the MECC computer loaned to them for the 1983-84 school year with the understanding that the out-set of the school a schedule will be established for the use of the computer so that students will be exposed to the MECC software and evaluation process will be continued. In addition, a log of use (by date and time) should be completed and submitted on a monthly basis. A person in each building should be designated and responsible for log completion and accuracy. If, at any time, the utilization of the computer is not sufficient to warrant remaining in a specific building the computer should be removed and located where utilization has proven a need for more access to a computer.

Through this inservice program teachers have had an introduction to computer materials and how they might be used to support our present curriculum goals.

SECTION III. WHERE WE'RE GOING

A. Introduction

As noted in Section I the Computer Planning Team believes that students need to become familiar and comfortable with the computer and have some proficiency in using it as a tool. It's the Team's opinion that the computer revolution as discussed in Megatrends is sufficient to warrant school districts to provide educationally sound opportunities to prepare students to live and work with computer technology.

Many recent articles contend that school districts are responding to the momentum without much thought or planning. In Worthington, much of this year has been devoted to planning and investigating alternatives. Although there is pressure to act now and some would advocate purchasing vast amounts of equipment, all purchases have been made after careful and thoughtful study of the benefits and consequences.

A case in point is the high school computer science lab which experienced a great deal of difficulty with existing equipment. Rather than replacing the equipment with a more current model, several steps were taken to assure the best use of resources was made while also providing for program and student needs.

In the fall, several microcomputers were installed to determine if this type of hardware would meet the high school computer science needs. After finding out that the stand-alone micros did not provide the kind of flexibility needed for the program, other alternatives were investigated. After contacting several school districts and vendors, district representatives visited a school district in Michigan that had a configuration which seemed like it might meet the high school computer science needs. As a result of this intensive and careful investigation a networking system of micros was piloted during the second semester.

This illustration points out the need for thoughtful planning. Individual staff have spent considerable time reading and researching before making recommendations to undertake any of the pilots. The same is true in terms of the recommendations for the forthcoming year.

The Computer Planning Team believes that the Framework (See Section I.) developed earlier this year combines the basic elements that will provide a comprehensive program for all Worthington students. It is essential, in the view of the Computer Planning Team to provide consistent computer experiences to all students. This section includes the team's recommendations with respect to Spring 1983 pilots. A discussion is also included regarding the hardware configuration proposed for the 1983-84 school year, and additional pilots proposed for the 1983-84 school year.

B. Recommendations As A Result of Pilots

This section addresses the spring 1983 pilots and recommendations regarding the continuation of the pilots for the 1983-84 school year.

1. Logo Pilot

Logo is a computer language that stresses student exploration leading to better skills in problem solving. As a language, Logo should serve as a vehicle for student learning. The Computer Planning Team believes that this philosophy is integral to its success and application in the primary grades.

The Team recommends that Logo should be used as the sole language taught in grades K through 3. To achieve this objective, the Team believes that teachers will need extensive inservice to become adept in teaching and using the language in the classroom.

This year seven K-3 teachers were involved in the evaluation of the language and were the first to use it with students. The team proposes that seven additional teachers be selected to use it with their classes this fall, and seven more selected in January. This incremental recruitment and inservice of teachers provides for the systematic inclusion of Logo into the curriculum with the expectation that by fall, 1985, all teachers in these grades will be prepared to teach and use Logo.

2. High School Computer Science Hardware and Language

This pilot was designed to investigate a new hardware configuration as a replacement for the existing equipment. The pilot findings indicate that the networking of micros was an effective approach. Therefore, the Team recommends adding six computers to the configuration which will provide a network of 12 micros.

In the advanced computer science course Pascal, a computer language, was introduced. The results indicate that Pascal is worthy of inclusion in the graded course of study. During this semester, several high school, middle school and elementary staff are participating in a six-session Pascal inservice to learn more about the language and its potential. Whether Pascal should be the only language taught in advanced classes or included in the introductory courses are questions that remain unanswered.

3. Business Department

The business department staff spent considerable time during their pilot exploring the potential of the computer in various business courses. The teachers in the department have shown a great deal of initiative and have sought opportunities to learn more about the computer and software applications.

It is the belief of the Team that students need the opportunity to use computers in and through their courses of study. Students are likely to be impacted by computer technology and will need to be familiar with both its capabilities and limitations.

As more software is developed and teachers learn more about potential applications, students will begin to recognize the wide range of uses and not be deterred by the lack of programming skills.

The Computer Planning Team proposes that four or five additional computers should be purchased, but that these computers should be used and available for all non-computer science instruction at the high school. For example, the geometry course of study contains a unit requiring computers and could utilize this bank for teaching the unit. This mini-bank of computers would relieve the burden on the computer science lab.

To insure coordination among the different departments, a planning team needs to be instituted which would include one teacher representative from each of the following departments -- math, science, English, social studies and business. The team would meet monthly and maintain a log of times and uses of these computers. Based on the results of first semester usage, an additional seven computers could be purchased for second semester assuming the 1984 budget permits this expenditure.

4. Special Education Application

The teachers who participated in the pilot found a number of benefits in using the computer. Some of the initial pilot questions were not totally answered because of the short time the computer was available at each level -- elementary, middle school and high school.

The Computer Planning Team believes more time is needed to address issues such as whether motivation is maintained when the computer is available more often and whether there are sufficient varieties of applications so that the computer is not a single-use tool. The team recommends that the computer again be rotated among the three levels and that one teacher from each level form a user group with the special education director. A log needs to be maintained which indicates the applications used and the outcomes of each.

Increasing numbers of special education software programs are being developed, but most are inadequate. Therefore, some of the potential use may be limited by the availability of quality software.

5. English as a Second Language

The teachers involved in this pilot spent many hours determining how best the computer could be used to help students who require English language skills. Although the teachers agree there is some promise in its potential usefulness, there are several overriding issues such as the need to have the spoken word as part of the learning process.

The Computer Planning Team recommends that those involved this year should continue during the 1983-84 school year to study the computer's potential. Again, ESL teachers should meet monthly and maintain a log of all uses and findings.

6. Alternative Campus

Some problems such as undertainty of use and lack of supporting software hampered this pilot. Even so, the students at the Alternative School had the availability of the computer to use, and several activities were undertaken by the end of March including staff inservice which should lead to greater utilization.

The Computer Planning Team believes that the computer should remain at the A.P. for the forthcoming school year with the understanding that efforts need to be intensified and plans made for its use. If the use of the computer is minimal then it may warrant reconsideration for the following year where utilization and need are greater.

The continuation of the pilots at the same or expanded levels are made based on the preliminary written and oral reports submitted to the Team. The Team recognizes that the pilots were not started until mid-January; therefore, only about two months of actual usage are reflected in these preliminary reports. As noted in the recommendations, on-going planning is stressed with logs required. It is the belief of the Team that careful attention needs to be given to each of these areas so that the benefit to students can be studied.

C. Pilots Proposed

The Computer Planning Team not only considered the status of existing pilots but also identified areas in which decisions or ideas have not been tested. In January, the Logo pilot was designed as a K-3 endeavor. At the same time the team recognized a decision would need to be made regarding an appropriate language for grades 4 through 8. Several alternatives were considered including expanding Logo as the primary language for all elementary grades.

Because BASIC is the resident language of the vast majority of micros, the team believes that all students need some exposure and proficiency in this language. Again, like Logo, the team believes the benefit to students lies in the application of the language and not in the realm of "pure" programming skills. BASIC can be taught in conjunction with some existing curriculum objectives, yet some new objectives may need to be added to the curriculum.

To introduce BASIC into grades 4 through 8 the Computer Planning Team recommends working with seven teachers with each elementary sending one fourth and one sixth grade teacher. These teachers would attend an inservice session this summer to prepare for using and teaching BASIC. The pattern would resemble the Logo implementation with additional teachers inserviced in January 1984 and September 1985.

These teachers would be responsible for developing sequential activities for their grade level. The computers as described in the following section would be used by these staff.

At the middle school both the inclusion of BASIC and other computer concepts is more difficult because of the newly revised state standards which require all students to take both art and music. The Team strongly believes that some structured program should be taught to all seventh and eighth grade students.

Because of the immediate problems facing the middle schools in terms of space and curriculum, the Team recognizes that a short-term plan may need to be instituted, but the Team does not wish to lose sight of what is needed to meet the needs of our student population at this level.

As a short-term plan, the mathematics curriculum at either or both seventh and eighth grades would incorporate computer science concepts and some BASIC programming. This could be done in two ways. One, some computer concepts could be taught in concert with existing objectives so the computer is the vehicle for achieving these objectives. Two, some computer science aspects may need to be added to the curriculum. The mathematics staff would need to identify the areas within the curriculum in which less time needs the devoted to them. If this type of short term plan is adopted, it will require substantial planning on the part of the mathematics teachers at both middle schools to make these changes.

The reason the team sees this plan as a short-term alternative is that the applications and understanding of computer utilization becomes embedded in the mathematics program and a broader viewpoint may not be achieved. In the long term (September 1985) two alternatives could achieve the broader perspectives; however, other alternatives may also be feasible. The description of the two alternatives that follows should not be viewed as the only legitimate approaches.

One of the long-term alternatives would involve instituting elements of computer awareness and programming into all the 'core' subjects. For example, the social studies curriculum would involve studying the impact of the 'computer revolution' on institutions and society. In English classes, the computer could be used to help students develop and strengthen their writing skills, while programming objectives would be part of the mathematics curriculum. In the same way, the science curriculum could be reviewed and units added to look at issues like robotics and artificial intelligence. This alternative is an integration approach and as such would require a substantial amount of teacher involvement and inservice. As an alternative, it is appealing because of the diverse applications to which students would be exposed; however, it means revamping or at least rethinking the current curriculum.

The other long-term alternative would involve the development of a separate computer science 'survey' course. Such a survey course would require personnel to teach the course and the development of a broad-based curriculum to cover both BASIC programming and awareness elements. The inclusion of such a survey course might be offered for nine to 12 weeks to all students at either the seventh or eighth grades. To institute this alternative would likely mean adjustments in some other subject areas. The alternative is attractive from several points. One, the person who teaches the subject would be a specialist much like art or music and could concentrate in insuring the course remains current. Two, a separate 'survey' course would serve the majority of our students needs in this area which could potentially reduce the number of students who need or want to take high school programming courses.

Both of these long-term suggested approaches will require discussion with staff and those responsible for curricular decisions. At the same time, the consequences of both need to be considered in terms of curriculum and personnel.

The preceding discussion has focused almost entirely in the languages for K-8. Although the team proposes introducing Logo in K-3 and BASIC in 4 through 8, the team believes that Logo should not be lost, but, in fact, continued through all grades. But, pragmatically the initial incorporation would be as outlined above. In time, Logo would be extended to grades 4 through 8 which would mean students would have the advantage of using either BASIC or Logo depending upon what is needed. The team does not see this happening for a number of years but would like to retain this ideal as the long-term goal.

In addition to the institution of BASIC, beginning with 4th, 6th and some incorporation at the middle grades, the team proposes a pilot to investigate the use and application of word processing and key boarding. This pilot would involve seven 5th grade teachers, one from each school, as well as at least two teachers from each of the middle schools. The teachers who participate in this pilot would attend inservice sessions in August to become familiar with the process programs and prepare the skeletal units for the pilots. The pilot could also involve some high school English teacher.

Earlier this year, the Team recognized that at some point, word processing because of its potential would need to be studied. This pilot would be conducted to determine its usefulness.

D. Hardware Configuration

In the preceding section, the discussion focused solely on the curriculum aspects of computer science and related issues. In this segment of the report, a hardware configuration is proposed for the 1983-84 school year.

One of the most difficult issues facing districts is building programs and teacher enthusiasm and coupling that with availability of hardware and software. Some districts measure their progress of instituting a computer education program by the amount of hardware purchased. In Worthington, the Team has attempted to combine the elements of programmatic direction and teacher readiness with hardware and software purchases. The Team and Task Force are concerned with hardware lying idle.

The configuration proposed maximizes utilization across the district. If at the end of the 1983-84 school year additional computers are warranted, the configuration can be expanded to meet the increasing needs.

Six alternative configurations were studied along with the advantages and disadvantages to each. The Computer Planning Team, the Executive Director of Education and Assistant Superintendent for Instruction reviewed the alternatives and arrived at the preferred configuration.

In the proposed configuration a total of 46 microcomputers would be purchased. Thirty-six of these computers would be grouped into three banks of 12 each. Each bank would be rotated through the elementary and middle schools. Each school would have a bank for six weeks during the first semester and again for six weeks in the second semester.

While the bank of computers are available in each school, the teachers involved in the pilots (BASIC, Logo and word processing) would have the opportunity to use the computers for whole group instruction. Therefore, for part of the time in which the computers are in a building they would be grouped for large group instruction. For the other part of each week, the computers would be scheduled out to individual classrooms for use by all staff to use courseware programs.

To make the best use of the computers while they are available at each building substantial planning will be necessary. Each building will establish a building-level planning team consisting of teachers, the media specialist and the principal. One of these persons will be designated as the team leader.

Another aspect of the configuration was discussed earlier which relates to the high school. Because of the growing interest by departments in utilizing computers to assist in the teaching of their courses, four or five computers would be purchased this fall for inter-departmental use. Depending again on the utilization of this mini-bank of computers, an additional seven computers would be purchased in January 1984 (1984 budget) to expand the bank for whole group instructional use. To insure pre-planning and coordination, and as proposed earlier, a representative group of teachers plus one high school administrator would be involved in the on-going determination of use. The group would also provide time and opportunity for the bank to be used by Kilbourne staff.

As noted previously some math courses presently contain units which require access to computers. In the other departments, experimentation will be required to ascertain ways the computer can best be utilized. The courses of study may need to be revised to reflect these modifications. For example, the business department has found several software packages that may strenghten the program offerings in several courses, but they need the opportunity to use them with whole classes before any final determination can be made concerning appropriateness.

E. Computer Awareness Development

The Computer Planning Team believes the use of computer technology in instruction can be divided into three areas -- awareness, interaction and programming. Development and planning for the interaction and programming aspects began in the fall, 1982 through the development of five pilot projects. These pilot projects, while having very diverse objectives, were primarily concerned with the interactive and programming facets of using computer technology. It is vital that development of the third facet, awareness, begin so students are provided a broad understanding of computer utilization and its implications.

The planning team further believes the opportunities for interaction and programming should increase from kindergarten through eighth grade with these aspects accomodated through elective courses in grades 9 through 12. The awareness aspects, on the other hand, should decrease from kindergarten through twelveth grade with the majority of the awareness being presented in grades K-8.

The computer awareness portion of the curriculum would provide students with an overall appreciation and understanding of computer technology. Issues which would be covered include: ethics, legal issues, historical background, effects on society, career opportunities, robotics and artificial intelligence.

While it is essential that the awareness aspect be integrated both with the present curriculum plus the interactive and programming portions, it must be developed to include a variety of activities and experiences for students. The development of this awareness curriculum will require an extensive search for information and a massive writing effort to produce new innovative materials for this yet undeveloped portion of computer education.

Because of the magnitude of this curriculum development effort, a large number of individuals would be involved. Individuals would represent each grade level, K-8, to insure proper scope and sequence development and to promote the exchange of ideas and creation of activities. The proposed composition of the Computer Awareness Curriculum Development Team would include: the Curriculum Coordinators who would act as liaisons and provide assistance in answering curriculum questions; the Computer Coordinator; and four teachers per grade level. The following timeline is suggested with corresponding activities.

Timeline 1983	Activity
March-April	Expectations and goals for the Team will be developed by the curriculum coordinators, planning and evaluation coordinator, and the instructional computer coordinator and two members of the Computer Planning Team.
May-May 15	Expectations, goals for development team are provided to staff and individuals are given the opportunity to indicate their interest in participating as a member of the Team.
May 15 - May 20	Team is formed from interested individuals. Selection is made by the curriculum coordinators, planning and evaluation coordinator and the instructional computer coordinator.
May 20 - June	Team members would meet once prior to summer vacation to discuss the upcoming tasks, timeline, etc. of the team. This would allow the sharing of appropriate literature with the Team and permit individuals to think of the needed aspects to such a curriculum.
June - July	Two members of the Team are provided a stipend to undertake information searches.

August 1983 (4 hrs. stipend)	Half-day workshop conducted to develop preliminary objectives.
Sept. - Dec.	Team members attend O.S.U. class and begin work on awareness curriculum. (O.S.U. personnel contacted about the possibility of setting up a curriculum development class for for fall 1983. While one O.S.U. staff member would have primary responsibility for the class an attempt would be made to have O.S.U. staff members from various disciplines involved in class sessions to provide the opportunity for development of a number of diverse activities for the awareness curriculum.)
1984 January 1984	Entire team meets to review objectives and timeline.
January - June	Materials that have been developed are tested and revised and curriculum development continues.
June 1984	Initial materials have been developed, tested and revisions made. Preliminary integration is determined.
Sept. - Dec.	Materials are further tested on broader base. Revisions are made based on teacher feedback.
1985 Jan. - June	Materials are further tested with revisions made based on teacher feedback. Curriculum integration is finalized and the curriculum is ready for inclusion in the 1985-86 school year.

IV. ISSUES FACING THE DISTRICT*

In the discussion which has preceded which describes what we have learned along with a suggested approach for the 1983-84 school year, there are some inherent issues that will need to be addressed. Some of these issues deal with programmatic thrusts while others deal with staff, hardware configurations and software. The order in which the issues are discussed below in no way reflects a priority listing.

Issue 1: Computer Languages in K-6

Incorporating Logo and BASIC into the curriculum poses some concerns. This year a committee of elementary teachers has been looking into the constraints of time and the curriculum. The concern exists that the curriculum contains so many elements that it is becoming more difficult to attend to all these matters effectively. The new state standards also impact the curriculum with requirements calling for the teaching of career education, citizenship and human relations.

At this time, it is unclear how much time should be devoted to Logo in K-3 and likewise BASIC in grades 4-6. Regardless of whether instruction in computer-related areas requires one or five hours per week, the question remains what part of the curriculum it will supplant , if any. Earlier in this report in discussing the inclusion of computer languages, the thrust is to use computer language to achieve existing objectives like problem solving and minimizing the creation of new objectives. Although this may be the best approach, the practical application may be more difficult to achieve.

At some grade levels, it may be best to provide more time to develop skills and knowledge of the computer language while at other grade levels the emphasis may well be on the applications of the language. Regardless of the approach taken, careful attention will need to be paid to overcrowding the curriculum.

Some parents and educators across the country question the advisability of introducing computer languages for fear that it may infringe upon the teaching of the basics. On the other side, advocates of computer language inclusion believe that the basics will not suffer but be strengthened as a result of the advent of this technology. Again, those teachers who participate in the pilots need to consider this matter in an on-going way.

Issue 2: Teacher Readiness

In the approach that is proposed in this report, teacher readiness is considered by suggesting a phase-in implementation process. This approach presumes that teachers will elect to learn and become involved without being required to take part. The plans reflect the recognition that the majority of those who are currently teachers in the district have not had opportunities through their pre-service education to learn about computers and their application to the classroom setting. If teachers continue to demonstrate an interest and willingness to take part, the major effort will be providing the type of inservice programs that insure theachers are prepared and comfortable in using computers.

*This section was prepared and reflects the concerns of the Executive Director for Planning and Evaluation.

As the program becomes more formalized new teachers and administrators employed by the district will require adequate inservice. Although many colleges of education are beginning to incorporate computer-related courses in their pre-service programs this is not universal. Therefore, that dismay desire or need to require some proficiency with computers as a condition of employment. If the decision is in the affirmative, other decisions will need to be made in terms of what is meant by proficiency--the skills to use the computer as an instructional tool and/or skills in programming.

Issue 3: A "Survey" Course

Because of the incremental approach being taken to institute the computer program in grades K-8, many students will not have had a great deal of exposure to the computer other than perhaps using it with courseware. Courseware in this context means prepared programs designed to supplement exisign courses of study. With increasing public recognition of the importance of some understanding of the computer technology, parents are likely to encourage their children to take what is available through the schools.

At this time, the only course that provides this opportunity is the introductory computer science course offered as an elective at the high school. This course is designed as a programming course not as a general survey of computer technology, and therefore may not provide the broad base of understanding that is desired.

In past years, about 200 students have enrolled in either the introductory or advanced computer science courses. This year almost double that number has pre-registered for these courses and the majority for the introductory course. This increase of interest may likely be a result of the concern to insure that the student has some background in this field before graduation.

Traditionally, survey-type courses and initial exposure to a field of study are provided to children in their middle school years where all students are given like experiences. As one of the long-term alternatives (Fall, 1985) a survey-type course is proposed as part of the middle school program. Whether such a survey course should be offered at this level or at the high school is a question that needs to be addressed in the next few months.

If the decision is to offer the survey course at the high school level, this will require rethinking and perhaps revamping the current introductory course with less emphasis on programming and more attention paid to the whole areana of this technology. Antoher consideration is whether the district believes all students need and should have such a survey course. If the answer is in the affirmative, the survey course would become a requirement for graduation and a decision will need to be made whether a nine week or a semester course would be best.

In the meantime, the number of students who wish to take a computer science course will likely remain high. The decisions that are made impact personnel, space and equipment purchases. A number of alternatives need to be considered for the short term, the 1983-84 school year. For example, the present lab

utilizes six micros networked with the Nestar. The 1983-84 plan calls for increasing this number to 12 in the lab; however, a second lab could be operated with the additional six. With class sizes at between 24 and 27 this would mean about four students to a micro.

Another alternative would be assembling the four MECC computers assigned to the high schools plus using the one from the alternative campus pilot and one from the business department pilot. These six plus the planned purchase of six additional micros would allow two computer labs to operate with nine computers in each. In this configuration approximately three students would be assigned to a computer lab with class sizes of 27. The MECC computers are used by many staff for their development of materials for their own classes. This use could be offset by the planned purchase of four or five computers for inter-departmental use. The most serious drawback in this configuration would be to the alternative campus.

Other alternatives include: operating additional computer science classes before and after school or offering computer science during summer school for those who pre-registered free of charge. Some of these alternatives may be more viable than others and each has implications on staffing and facility utilization.

Regardless of the alternative selected for this year, the district will need to determine what computer science all students should have before they graduate and whether the present high school offerings reflect this need. The decision will impact both the middle school and high school curriculum in this area.

Issue 4: Software Selection

This spring a software evaluation committee has been formed to made recommendations for district-wide purchasing . At the outset software will be purchased to correspond to the curriculum. Some parents and staff believe that individual schools and staff should have the ability to purchase what they believe will benefit their school or classes, much like the purchases of supplemental materials.

At this point, the focus is on purchasing software and incorporating it into the curriculum and not as a matter left to individual interest or discretion. In time, when teachers become more comfortable with the computer and more software is available such a decision will need to be re-evaluated. The issue of equity is the overriding concern at this time so that the district can insure that students regardless of the school they attend will benefit from these purchases.

Issue 5: Hardware Selection

One of the most difficult tasks facing any district is making its hardware purchases so there is neither over nor under purchases both in quantity and computer capability. Form following function has been the rule used by the Computer Planning Team in that programmatic needs are first identified before determining hardware needed.

In Worthington several program aspects are being studied simultaneously. The program areas can be divided into three thrusts--one, using the computer as a tool to supplement existing curriculum which means procuring courseware materials that require little or no programming skills; two, using the computer to enhance problem solving skills in which some programming skills are required; and three, studying the computer which involves more in-depth programming skills.

Some districts are focusing on only one of these areas. If a district's priority is courseware, the major concern is purchasing hardware which has the most and best software available. If a district's commitment is to programming skills, another set of criteria may apply for making hardware purchases.

Because of Worthington's multi-faceted approach, the hardware decisions have been made based on which machine can be utilized across these three areas without over purchasing in terms of computer capability. The Team believes that for cost effective purposes the district should purchase one type of computer. In this way, the equipment is standard regardless of use. This same approach may not be best in two or three years but at present there are several advantages to this purchase approach.

- Teachers are only beginning to become familiar with computers so one type of computer can reduce anxiety and increase teacher use of the computer. As teachers become more knowledgeable and adept with using the computer, this concern will likely diminish.

- The district has a relatively small library of software. Most software is hardware specific. With more than one type of computer, software would need to be purchased for each type; thereby reducing the software available to all schools and staff. With different equipmetn and software, the goals of incorporating software with the curriculum would be much more difficult to achieve.

- Because the district is still in its initial steps of determining what is required for district-wide implementation, any purchases of hardware need to insure flexibility.

At this time, the purchase of a single type of computer has many more advantages than disadvantages; however, the district needs to continue considering hardware from a programmatic standpoint. There are good arguments to support the purchasing of a variety of different computers so that students have this kind of experience. In time, it may be reasonable (program and cost) to provide such diversity.

APPENDIX A

INSTRUCTIONAL QUESTIONS POSED TO BATTELLE

QUESTIONS FOR BATTELLE

Question #1

Identify districts both in Ohio and nationwide that have an integrated computer program for specific instructional areas/disciplines and complete the chart below for each district. Include the name of the contact person for each district.

Name of District_____

Address_____

Contact Person_____ Phone_____

Indicate by placing an (x) in the appropriate column whether the district has an integrated computer program in place for that particular subject in the grade level columns identified and a brief description of the system hardware.

	ELEM	MIDDLE	HIGH SCHOOL	DESCRIBE SYSTEM HARDWARE BEING USED
Special Educ. (LD/SBH/EMR)				
Gifted				
Mathematics				
English*				
Social Studies				
Science				
Art				
Music				
Foreign Language				
Business Educ.				
Vocational Ed.				
Computer Science				
Other areas, specify_____ _____				

* At the elementary level English includes reading, language arts; and at the secondary level it means composition, literature, writing, journalism, etc.

#2

Question #2

How have other districts in Ohio and nationwide procured and utilized software with regard to management (distribution throughout district, cataloging, monitoring the use; quality; types, e.g., CAI, CMI, simulations, drill and practice, achievement monitoring; internal development; copyright, ownership and external distribution; and cost.

Question #3

What impact is there on staffing when implementing a computer instruction (K-12) program in terms of; 1) inservice activities; 2) internal structure; 3) cost associated with staff training and inservice; 4) need for new staff positions or modifications of present staffing procedures; and 5) staff readiness, acceptance

Question #4

1) What are the most widely-used definitions of computer literacy relative to K-12 education? 2) What modifications in the curriculum have been made to achieve "computer literacy" in each case? 3) What is the method used in each case to assess "computer literacy"?

Question #5

What are the advantages and disadvantages of the following configurations: 1) micros of the same kind; 2) a variety of different micros; 3) mini system; and 4) a combination of mini(s) and micros. Review these configurations in terms of: initial and continuing cost; maintenance, repair and warranty; peripheral hardware available; user friendliness; life expectancy; languages available; school districts currently using these configurations; technical aspects; and site preparation requirements and cost.

	Same Type of Micros	Different Micros	A Mini System	Combination of Micros & Minis
Initial & Continuing cost				
Maintenance - Repair & Warranty				
Software availability and compatability				
Peripherals				
User Friendliness				
Life expectancy				
Languages available				
School Districts				
Site Requirements, preparation, cost				

Question #6

What conclusions from research are available regarding: specific language(s) most appropriate for a given subject area, grade level or ability level of students; student usage of computer as related to cognitive/affective development; achievement related to student interaction time; introduction of keyboard usage at early grade levels; effectiveness of various instructional modes (CMI, CAI, etc.)

APPENDIX B

MECC INSERVICE PRE AND POST EVALUATION RESULTS

PRE-INSERVICE QUESTIONNAIRE RESPONSES

1. Grade level: Elementary

2. Have you previously attended a completed inservice workshop or a computer course?

23 Yes 12 No

3. Have you used a computer in conjunction with teaching?

14 Yes 19 No 2 Not applicable

4. In a word or two, describe why you wanted to participate in this inservice?

- Media position in school - Interest
- I'm an elementary principal who has been very involved already with helping teachers to implement computer usage and felt this was important to be involved in so I'd be able to continue in this active role.
- I am the librarian and must know this information.
- To learn how computer functions and the language (vocabulary) and how it applies to Special Education.
- Request of the committee
- My participation was requested by the superintendent
- As the Media Specialist I need to know what software is available where it will be stored and be able to assist my teachers.
- As Media Specialist I feel a need to be familiar with equipment and software which will be dissiminated from the Media Center.
- To become more aware of what is available
- To learn more about our developing computer programs and to add my input to that program
- To preview MECC materials
- To learn about software and to gain techniques which would prove useful in resource room.
- I wanted to be in from the "ground floor" and commit myself to others in my building
- My experience has been very limited.
- I feel the use of micro computers in the classroom should be an immediate goal.
- I want to use the computer with classroom
- To be familiar with software to be implemented and to be able to assist staff in use.
- I'm interested in extending the use of computers in my classroom.
- Learn more about computers as instructional aides in teaching and learn about new software.
- To learn
- To see the MECC software and begin thinking how it can be used with our children.
- Excited about using computers - anxious to be able to use MECC materials - want to learn as much as I can - willing to help others.
- Very interested in computers
- Interest and need for materials
- To learn how to use computers and discover how it might be used in the classroom
- To learn how to operate a computer and get an idea of instructional possibilities
- Interested in a possible new and exciting tool for educating children
- I have been interested in how computers can be used in the classroom
- To learn about computers - I am not familiar with their use
- To learn how to program a mini-computer for business and personal growth

- I want to be involved in the development of computer instruction. Secondly, principals didn't have a choice.
- Need to know about them and how to use them - coordinate storage -- hope to eventually put some library clerical work on them.
- As an elementary principal how can I best facilitate the use of the computer in our building.
- It's the coming thing - individualization is our (Spec. Ed.) thing - it fits perfectly.

5. How would you best describe the attitude toward using computers as an instructional tool in your building?

- I see advantages & disadvantages. Would like to avoid using computers as drill tool
- pretty positive
- Isolated to classrooms of only a few teachers
- Hesitant
- Positive
- Positive, but needs to be exposure to computer use
- Interested, want to know more
- Open - but fearful - lack of knowledge - fear of unknown (parents want it)
- Very good - more demand than equipment
- Eager, but ignorant
- Some anxious to begin - some fear it's use
- Ready to go!
- As CAI - very positive. If every person has to be a programmer - negative.
- Receptive and eager
- High level of interest
- Good but fearful
- Open-minded, excited, but overwhelmed
- Very strong at central office
- Good - 2 in building are used
- Interest level there, but lack of exposure
- Important part of lives, need to be involved
- Enthusiastic
- Want to learn but very uncertain; apprehensive
- Super, lots of interest
- Positive attitude, though use is limited
- Various - a few strong negative attitudes among staff

6. What do you see as the biggest impediment in the use of computers as part of the instructional program?

- The software I've seen leaves lots to be desired
- One computer per building would lessen amount of time per teacher
- Lack of teacher knowledge
- Teaching teachers to be comfortable with it and find the right instructional programs
- Planning and scheduling for its use
- Possibility that computers would replace one-to-one work between teacher/student
- Training - Then hard and software
- Integration into regular program
- Having enough computers; adults' fear of them
- Scheduling

6. (Cont.)

- Training, exploration of materials, classification, categorization, and sequencing of applicable materials
- One more thing to fit into the curriculum - so teachers need assistance in getting children onto the computers - volunteers, etc.
- Not enough computers and even less software
- Time concerns; integrating - making it a vital but "part of" curriculum
- Time and money. Time for teachers to become familiar with materials & equipment, and money for enough hardware.
- Lack of equipment and knowledge of programming
- Training teachers to be comfortable with computers
- All students want to use it at same time; teaching youngsters how to use it
- Not being able to have some kids working with computer and teach rest of kids while they are gone. Computer usually not in teacher's room.
- Time in terms of academic load on children
- Cost

7. How do you see yourself and others using the computer?

- As a resource room teacher I need tools to deal with individual problems
- To help Special Ed students get excited about learning
- That's what I'm here to find out
- Library applications
- Practice of skills taught
- Not sure
- At home - I want to stay on the cutting edge of home computers
- Instructional tool - learn basic programming
- Library organization (clerical, record-keeping)
- Administratively - the computer could be a great tool for the office
- Drill and practice - for individual instruction
- Management purposes and helping teachers use the computer
- I see myself as a dispenser of software and a teacher to the students for use of the computer
- Facts, problem solving, creating situations to solve
- If we get them we'll use them
- In library could be used in managerial ways such as overdues.
- In all parts of curriculum as well as aiding in clerical tasks
- Practice math skills
- Encourage others to use computer and use it myself
- To instruct, problem solve, keep records
- Drill and programmed instruction
- Would like to use both as remedial tool, extended use for talented and for all children to have exposure
- Enrichment and re-teaching in all areas
- Teaching Basic Language, Simulation, Drill and Practice
- Reinforcement; Creativity - EPP
- Teaching concepts unable to be taught in traditional ways
- Computer literacy and graphic activities
- Myself - learning tool development of skills areas as well as cognitive development (EPP Program)
- Administrative work in Media Center i.e. overdues and bibliographies, etc.

8. In a word or two, describe how you feel about educational use of computers?

- It has possibilities
- Very positive
- An exciting concept
- Sky's the limit. Great potential for instruction. Should be great help in library reparations and teaching
- Very interested, but not knowledgeable
- Helpful and fun for the children
- A motivator
- Extremely important
- Lots of potential
- Without a doubt, the time has come
- Possibly a valuable tool
- Necessary if we are to be an integral, current member of the communication world
- Good, good.
- We're behind now. Let's get going.
- Very important for children in this computer age.
- A must in today's education
- Very supportive
- Insecure
- Not sure yet
- Very much in favor and have already designed some programs for class use
- Only limited by mind and cost

9. What, if any, concern do you have about using computers as an instructional tool?

- Time element is critical. Cannot see myself learning from scratch.
- Time use of a computer in the building
- Student ability to use it
- Concern over competency and comfort with computer
- None
- That they don't become an expensive toy
- Hopefully all students can be serviced
- Non-applicability of many materials to special students
- Having enough hardware and software to implement an effective program
- We shouldn't fall into trap of believing that computers can do all the teaching. Personal touch must still be used.
- Utilizing it to meet curriculum goals
- Hope we can work towards integrating the computer into the curriculum instead of making it a separate study
- Lack of equipment and knowledge of programming
- How to gear them to child's need for more exposure and repetition and master a skill and eliminate "game" attitude of students
- Cost
- Teacher education
- Would use only as a drill and practice tool

10. Other comments:

- Appreciate having inservice
- Excited
- We need to build software libraries
- District appears to be going about this challenge in a very well organized manner

INSERVICE QUESTIONNAIRE RESPONSES

1. Grade level: Elementary

2. Based on this workshop, how do you see yourself and others using the computer?

- media center support of the teachers and students
- library administrative purposes
- adjunct to all parts of curriculum
- tutorial tool for students assembling material
- for teachers, inventory supplies, books, etc., cataloging library books
- reading enrichment
- simulation, drill, graphics, word processor, management
- test, puzzle making, tutorial, record keeping
- additional modes of teaching "basics"
- aid to creating materials
- enrich, remediate and/or support teacher instruction
- use in Library-Media Center - child use and use for routine tasks (overdues)
- explaining program to staff and parents
- new approach for drilling skills
- spelling drill
- involve children with computer literacy
- teacher use in making tests
- teacher management
- inservice staff; presenting programs to students
- student learning of basic programming
- management functions

3. In your opinion, what do you see were the strengths of the workshop?

- hands on experience (most common response)
- well-organized presentation of materials
- opportunity to preview materials and use computer
- to get cursory experience in word processing
- working in small groups
- expertise of workshop leaders
- interaction with other staff members
- more than one representative from a building
- clear explanations
- one computer for two people
- having CPT members present to circulate and answer questions
- patience of instructors
- how to use printer for dittos
- awareness of what's available
- realization of capabilities of the computer
- use of computer between workshops

4. What do you feel were some of the weaknesses of the workshop?

- definite need for more time on word processing (most common response)
- not enough time devoted to Teacher Utility Disks
- time frustration - overwhelmed by amount of material
- first two sessions - five people sharing one computer
- last session much too fast - confusing
- some materials presented too quickly
- too much material
- more time needed to learn vocabulary
- working conditions difficult - too cold, too crowded, hard to hear
- not enough time with computer
- not enough computers
- not enough printers
- bad time of year with holidays

5. What changes would you make in this type of workshop?

- more computers available
- full day for word processing alone
- more work on Teacher Utility Disks
- more private time with computer
- larger room
- more of it - not enough time
- more time with the basics
- smaller groups
- leader guide person for each school for effective follow-up
- need more depth
- a step by step approach for new concepts
- two 1/2 day workshops
- have topics so that participants can choose which they will attend
- more time to view utility disks
- fewer schools at a time

6a. The number of sessions:

3 Too many

15 Too few

11 Just enough

6b. The content of the sessions:

16 Excellent

13 Good

6c. Application of Session Content

11 Excellent

14 Good

2 Fair

7. How would you describe your own knowledge level before and after attending this series of workshops?

8 a. Knew nothing when started but now have some idea

21 b. Knew a little but now much more knowledgeable

8. On the whole, would you say the workshops were:

26 a. Exciting and helpful

____ b. Boring and disappointing

1 c. Mediocre

2 d. Other (varied between a. and c.; helpful, but learned more from school colleague than from workshop)

DID THE MECC WORKSHOP MEET YOUR EXPECTATIONS?

Strongly Agree	Agree
12	17

Comments:
- impressed with organization and planning
- would like to know more

DID THE MECC WORKSHOP PROVIDE YOU WITH SUFFICIENT COMPUTER BACKGROUND AND SKILLS TO UTILIZE THE MECC MATERIALS?

Strongly Agree	Agree	Disagree
7	21	1

Comments:
- need more time before able to teach others alone
- possibly needed to review handouts in more detail before coming to class
- need more practice
- need more inservice on teacher utility and word processor
- need more background
- need more help
- all except Apple writing - word processing

DO YOU NOW HAVE A SUFFICIENT BACKGROUND TO EVALUATE COMPUTER SOFTWARE FOR CLASSROOM USE?

Strongly Agree	Agree
7	22

Comments:
- can offer constructive guidelines to teachers
- individual philosophy will help to decide appropriate software
- working on it - very time consuming to carefully evaluate materials
- need more time to search materials
- depends on subject matter
- with more study
- some need to try for myself - utility disk
- for own class and their level and needs

DO YOU NOW HAVE THE BACKGROUND AND SKILLS TO ASSIST OTHER TEACHERS IN THE USE OF AND EVALUATION OF MECC MATERIALS IN THEIR CLASSROOM?

Strongly Agree	Agree	Disagree
5	23	1

Comments:
- on a very basic level
- need more practice and study
- with basic procedures only
- would need great deal of review

WOULD ASSISTANCE FROM OUTSIDE YOUR BUILDING BE HELPFUL TO IMPLEMENT USE OF THE COMPUTER AND MECC MATERIALS?

Strongly Agree	Agree	Disagree
8	14	6

Comments:
- feel need to try on their own
- more time to experiment with the word processing on their own first
- perhaps for questions that need answered
- perhaps a professional day 1/2 day release time for full staff computer workshop
- already have qualified people in own building
- need organizational tips
- definite need for someone to help

WILL ASSISTANCE FROM OUTSIDE YOUR BUILDING BE REQUIRED TO IMPLEMENT USE OF THE COMPUTER AND MECC MATERIALS?

Strongly Agree	Agree	Disagree	Strongly Disagree
1	6	17	4

Comments:
- always willing to have additional help
- would like to have someone available for questions

WHAT CHANGES COULD BE MADE IN THE MECC WORKSHOP TO IMPROVE ITS USEFULNESS TO TEACHERS?

Comments:
- more time on material from last session
- more practice time as a group
- involve more teachers from each building
- more on word processing as needed
- actual time at computer increased per individual
- more explanation of Teacher Utility Disks
- needs to be slower
- workshop by grade level - eliminates previewing time of inappropriate materials

WHAT ADDITIONAL COMPUTER ORIENTED WORKSHOPS SHOULD BE PROVIDED IN THE DISTRICT?

Comments:
- additional workshop on word processing
- programming
- to include other teachers on various levels of knowledge
- specific workshop on the Apple Writer capabilities and doing sample work
- meet on regular basis (every two months) to go over problems
- administrators may need more inservice
- follow-up on monthly basis
- teacher useage of: utility, Apple Writer, disk master to copy
- individual building inservices
- actual use in classroom and how to use in classroom with subject area
- summer workshop to involve new people

HAVING COMPLETED THE MECC WORKSHOP, WHAT SHOULD THE NEXT STEP TO INTEGRATING THE SOFTWARE INTO THE CURRICULUM?

Comments:
- evaluating materials for grade placement
- teacher involvement in actually using computer
- small groups to help organize use of materials in curriculum
- need to continue to sharpen skills
- use for awhile; don't be anxious; take time to see teacher interest and usefulness
- need more time to look at and evaluate materials
- review by classroom teachers, separating material at grade level
- get teachers interested
- graded system needed so there is no overlapping throughout elementary years
- identifying and cataloging
- more inservice from workshop instructors
- at building level, form committees including media specialist, for evaluation of materials for placement in curriculum

ADDITIONAL COMMENTS:

- need more computers
- excellent workshop

PRE-INSERVICE QUESTIONNAIRE RESPONSES

1. Grade Level: Secondary

2. Have you previously attended a completed inservice workshop or a computer course?

13 Yes 16 No

3. Have you used a computer in conjunction with teaching?

9 Yes 19 No 1 Not applicable

4. In a word or two, describe why you wanted to participate in this inservice?

- To learn to program in BASIC (or whatever is used); learn about Apple II; find uses for an education program
- We feel that computers could be a very important tool for individualizing for L.D. and other special education classes.
- Familiarize self with computer as an instructional tool
- To become familiar with software available; to find ways to implement computer in my science classes
- Interested
- To become comfortable with computer use in the library
- Want to learn how best to educate others in a future of computers
- For management purposes - always ready for something new
- Find out about computer use and their application
- To determine possible uses in my building
- To become conversant with use of computers; learn what is available in my field.
- I was asked to do it
- I know next to nothing about computers and their use in classroom
- To get a basic understanding of the operation of computers and implications for education
- Personal Interest - Professional Need
- As an aid to help academically disadvantaged students become motivated
- Need exposure if I am to be effective in leading our efforts in the High School
- To be able to assist students and teachers
- To become acquainted with appropriate software
- To evaluate the software programs recently purchased by the school
- To develop more programs to use in English 7, to find out what's available both for English and for our use in keeping records.
- There is an abundance of software available - I want to know what is Good and Why

5. How would you best describe the attitude toward using computers as an instructional tool in your building?

- Mixed. Excitement and fear of it being to complicated or difficult for teachers.
- Hope the students really enjoy and benefit by it
- Eager to get going.
- Positive
- Enthusiastic with caution and fear

5. (Con't)

- Excellent - highly motivated
- Open - most of us want to learn more
- Enthusiastic, about 1/2; unsure, about 1/2
- High interest among the students especially
- Cautious - is this a lot of fanfare?
- Very Positive for students - Mixed for teachers
- Upbeat
- Good, but many afraid due to lack of exposure
- Super support from principal
- OK, but I don't know anything about it and couldn't do it now.
- Slightly apprehensive, but eager to learn
- Developing interest

6. What do you see as the biggest impediment in the use of computers as part of the instructional program?

- To individualize during class
- Lack of enough computers and knowledge of appropriate software
- Scheduling so that one or more is available when needed
- Cost
- Not enough availability
- Fear of the unknown
- Lack of hardware and software
- Lack of proper facilities
- You cannot teach concepts or human behavior; money; availability of equipment
- Space and time
- Teacher training
- Misuse (for games)
- Resources;
- Lack of awareness of what computer can do
- Ignorance

7. How do you see yourself and others using the computer?

- To individualize during class
- Personally as a means of record keeping, and as often as possible for individualized instruction
- Reviewing software for use in classroom
- In classes, to avoid busywork; instant feedback
- Individualized instruction and management
- Problem solving; simulations; math drill
- Administratively and for student instruction
- Library - check in and out - Student use
- Classroom aid
- To help with scheduling, budgetting, pupil personnel
- Reinforce skills - vocab., instr./grammar
- Administrative uses
- Individualized programs, instant feedback to students
- As a supplement, except in specific math classes.
- To solve problems that would normally take a long period of time to resolve
- Student writing programs as instructional intensification
- Independent study
- Motivational

8. In a word or two, describe how you feel about educational use of computers?

- An important addition to learning
- We need to understand it to get maximum use -- exciting possibilities
- Let's go
- Great
- Positive - interested
- Beneficial
- I feel good about their potential with special education -- it will free me up for more contact with students
- Great as a supplement, but doesn't replace the teacher/aides
- A necessity
- Uninformed, enthusiastic
- They have a place and we can't escape it forever
- Our responsibility is to reflect society's movement into computer world
- The "in" thing. A "must" for the future
- Excited, but wary
- A useful tool, not the end
- I'm all for it
- For studying the English language as a SYSTEM, I think it's invaluable

9. What, if any, concern do you have about using computers as an instructional tool?

- Appropriate software
- Theft of equipment
- Not relying too much on computers for drill and practice
- Enough computers to do the job
- Damage
- Overdependence
- How I can really adapt this to my area
- Lack of time and facilities
- That they become an end in themselves - some kids see them as a sophisticated toy or game
- Accessability for all students
- Time to develop good programs
- Cost; training of teachers; teacher attitude
- Substituting for mastery of basic skills
- Breakdown of equipment; fairness in who learns and who uses (students)
- How to control - who decides who is in charge
- My competence
- Only one or two students can use it at the same time
- Should not be used for drill - but innovative
- Not to understand how computers are being used in society and its affect on society

10. Other comments:

- Eager to learn how to relate this to foreign-language education
- Excited

INSERVICE QUESTIONNAIRE RESPONSES

1. Grade Level - High School

2. Based on this workshop, how do you see yourself and others using the computer?

- word processing, record keeping
- remedial instruction
- creating materials
- drill and practice
- simulations
- Apple Writer
- games
- programming scheduling and credit information
- developing form letters
- generating tests and study guides
- classroom management
- reviewing software
- involving students (limited) and staff
- equipment inventory

3. In your opinion, what do you see were the strengths of the workshop?

- hands on participation and experience
- one to one responses when questions asked
- helpful workshop leaders
- knowledgeable instructors
- versatility, flexibility
- availability of computers and materials
- organization of materials
- understanding possibilities of computer use
- Apple Writer instruction
- time flexibility
- teacher involvement

4. What do you feel were some of the weaknesses of the workshop?

- not enough computers
- hard to do tasks and take notes at same time
- afternoon workshop - space limited
- need for easy access to materials from other grade levels for documentation
- time shortage
- pacing of instruction
- inconsiderate noise
- feel most programs applicable to elementary rather than secondary
- goals of each session very unclear
- beginners and advanced users mixed
- need shorter sessions
- organization of materials for take home
- too many people in first three sessions
- room too small
- too many participants per computer
- lack of understanding beforehand of what would be offered in the course

5. What changes would you make in this type of workshop?

- more computers
- provide written instructions and summaries of procedures learned
- Saturday workshop or after school day for more computer availability
- let it be for PAC credit
- more time for practice
- have materials available for building (documentation and disks)
- control talking and keep everyone at the same place
- group participants by experience level
- clear statement of purpose/goal
- smaller groups
- develop other "methods" of instruction (charts, visual aids)

6a. The number of sessions

6 Too few

7 Just enough

6b. The content of the sessions

6 Excellent

4 Good

2 Fair

1 Other (fair at beginning, fine at end)

6c. Application of session content

5 Excellent

4 Good

3 Fair

7. How would you describe your own knowledge level before and after attending this series of workshops?

4 a. Knew nothing when started but now have some idea

7 b. Knew a little but now much more knowledgeable

2 c. Knew a lot and workshops did not add to my knowledge

8. On the whole would you say the workshops were:

10 a. Exciting and helpful

3 d. Other (somewhat disappointing; confused; overwhelmed)

DID THE MECC WORKSHOP MEET YOUR EXPECTATIONS?

Strongly Agree	Agree	Disagree
4	6	1

Comments:
- actually did not work that much with MECC

DID THE MECC WORKSHOP PROVIDE YOU WITH SUFFICIENT COMPUTER BACKGROUND AND SKILLS TO UTILIZE THE MECC MATERIALS?

Strongly Agree	Agree
6	5

Comments:
- felt less anxious and more comfortable
- need more practice to feel secure

DO YOU NOW HAVE A SUFFICIENT BACKGROUND TO EVALUATE COMPUTER SOFTWARE FOR CLASSROOM USE?

Strongly Agree	Agree
2	9

Comments:
- possible after more experience
- still uncomfortable

DO YOU NOW HAVE THE BACKGROUND AND SKILLS TO ASSIST OTHER TEACHERS IN THE USE OF AND EVALUATION OF MECC MATERIALS IN THEIR CLASSROOM?

Agree	Disagree
9	3

Comments:
- use, yes - evaluation, not sure
- not yet, need more practice

WOULD ASSISTANCE FROM OUTSIDE YOUR BUILDING BE HELPFUL TO IMPLEMENT USE OF THE COMPUTER AND MECC MATERIALS?

Strongly Agree	Agree	Disagree	Strongly Disagree
4	4	3	1

Comments:
- good to know where there are resource people to call on
- help already in building

WILL ASSISTANCE FROM OUTSIDE YOUR BUILDING BE REQUIRED TO IMPLEMENT USE OF THE COMPUTER AND MECC MATERIALS?

Strongly Agree	Agree	Disagree	Strongly Disagree
1	2	8	2

Comments:
- already have knowledgeable staff member in building

WHAT CHANGES COULD BE MADE IN THE MECC WORKSHOP TO IMPROVE ITS USEFULNESS TO TEACHERS?

Comments:
- more hands on time
- need books and teaching programs
- more computers
- more quiet through workshop
- availability of documentation and diskettes for buildings
- shorter sessions
- grouping of participants by experience
- more material
- smaller groups

WHAT ADDITIONAL COMPUTER ORIENTED WORKSHOPS SHOULD BE PROVIDED IN THE DISTRICT?

Comments:
- programming skills
- availability of workshops for all teachers
- subject area workshops
- workshop for those without skills separate from those with skills
- more time on Teacher Utility disks and Apple writer
- would like full semester course

HAVING COMPLETED THE MECC WORKSHOP, WHAT SHOULD THE NEXT STEP TO INTEGRATING THE SOFTWARE INTO THE CURRICULUM?

Comments:
- continued and more extensive workshops
- time allotted for inservice training of other teachers
- promote teacher interest and incentive to use computer in curriculum
- evaluating existing software
- provide time for those who took workshop to help those without skills
- more computers

ADDITIONAL COMMENTS:

- feel more comfortable with computer since workshop
- hope for better accessibility of computers
- informative and well presented
- need district newsletter where teachers can share comments on commercial software they have used

APPENDIX C

MECC SOFTWARE EVALUATION FORM

MECC SOFTWARE EVALUATION FORM

1. Program name: _____

2. Overall rating ☐ Excellent ☐ Good ☐ Fair ☐ Poor

USE: RESPONSES BASED ON USE OF PROGRAM WITH STUDENT

3. Identify grade level with which program was used.
☐ K ☐ 7
☐ 1 ☐ 8
☐ 2 ☐ 9
☐ 3 ☐ 10
☐ 4 ☐ 11
☐ 5 ☐ 12
☐ 6

4. Identify subject area with which program was used.
☐ Language Arts/English
☐ Social Studies
☐ Science
☐ Math
☐ Art
☐ Music
☐ Other _____

5. How did you use this program? (check one)
☐ Simulation
☐ Tutorial
☐ Drill & Practice
☐ Educational Game
☐ Problem Solving

6. Which best describes your use of this program?
☐ Whole class presentation
☐ Small group work (3-10)
☐ Pairs
☐ Individual

7. Which best describes your use of this program?
☐ Remediation
☐ Enrichment
☐ Introduction to new material
☐ Review
☐ Diagnostic

COMMENTS _____

RECOMMENDATIONS

After using this program, I believe that it best fits into our existing curriculum at

Grade _____ Subject _____

Unit _____

How would you recommend using it? (check one)
☐ Whole class presentation
☐ Small group (3-10)
☐ Pair
☐ Individual

Which of the following would you recommend for this program?
☐ Use for remediation
☐ Use for enrichment
☐ Use for introduction to new material
☐ Use for review material
☐ Use for diagnostic tool

Check the one which you feel is the best application for this program.
☐ Simulation
☐ Tutorial
☐ Drill and Practice
☐ Educational Game
☐ Problem Solving

EVALUATION

For each of the following statements, circle the number which best represents your opinon of this program.

4-Excellent 3-Good 2-Fair 1-Poor

4 3 2 1 Sufficient documentation available
4 3 2 1 Content is accurate
4 3 2 1 Purpose is well defined
4 3 2 1 Presentation of content is clear and logical
4 3 2 1 Directions to student are clear
4 3 2 1 Feedback to student appropriate
4 3 2 1 Ease of student use

TEACHER'S NAME _____
DATE _____